

VIRIDUS HERATARI
SPECIES + DIAGRAMS

Amphitars

HEATH
Schlumberger

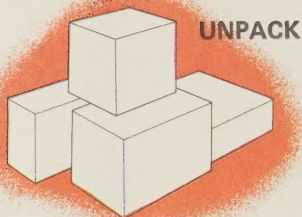


kit builders guide

**STEPS TO EASY
HEATHKIT ASSEMBLY...**

- UNPACK
- TOOLS
- RESISTORS
- PARTS
- ASSEMBLY
- SOLDERING
- INTEGRATED CIRCUITS
- MANUAL
- HEATHKIT SERVICE INFORMATION

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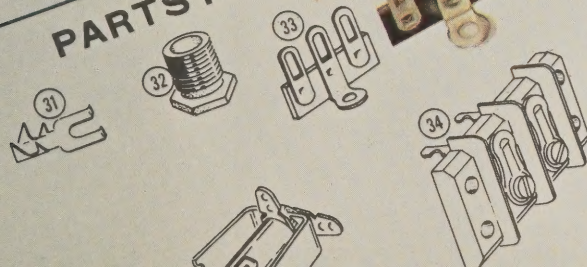


- ☐ Read any special unpacking information in the Manual.
- ☐ Save the packing material until all the parts are checked.
- ☐ Lay out parts so they will be handy when you assemble the kit. Muffin tins and egg cartons are ideal for holding small parts.

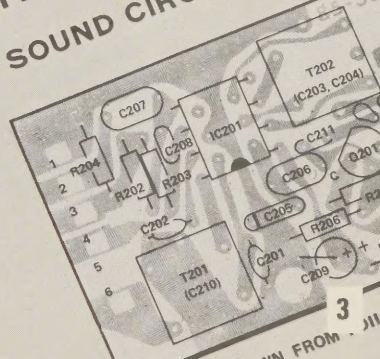


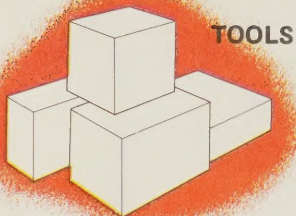
Check each part against the Parts List in the Manual.
Use the Parts Pictorial to identify parts. Hardware
items are usually drawn full size for ease of
identification.

PARTS PICTORIAL



CIRCUIT BOARD X-RAY VIEW SOUND CIRCUIT BOARD



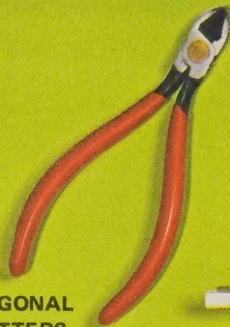


You will need these tools to assemble most of our kits.

LONG-NOSE
PLIERS



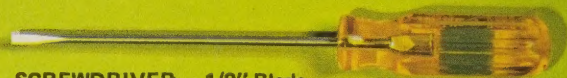
DIAGONAL
CUTTERS



WIRE
STRIPPERS



SCREWDRIVER - 1/4" Blade



SCREWDRIVER - 1/8" Blade

25-WATT TO 30-WATT PENCIL
SOLDERING IRON WITH A 1/8"
TO 1/4" TIP.



PLASTIC NUT STARTER
— Supplied with most kits
to pick up and start small
nuts and washers.

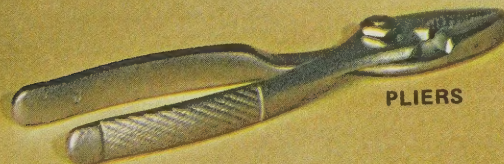
A good soldering iron is your most important tool. Choose a good one and keep its tip in good condition.

These tools, though not required, will make your Heathkit assembly even easier.



**HEATHKIT
SOLDERING IRON**
Designed especially for kit assembly.

NUT DRIVERS

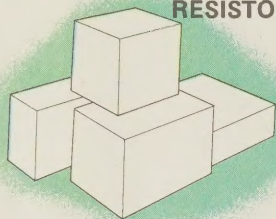


PLIERS



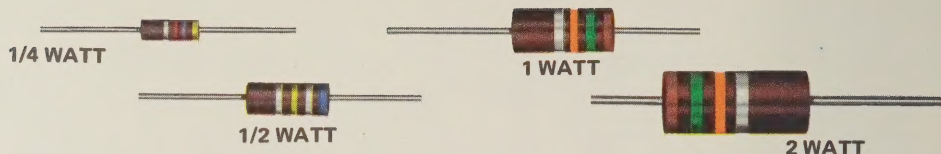
SOLDERING AID

RESISTORS

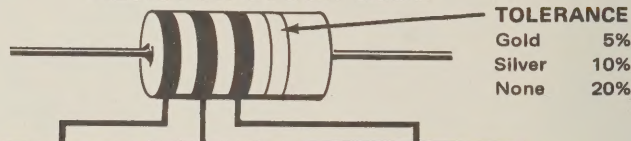


You're never confused with Heathkit parts because the Manual shows you exactly what each part looks like and where it goes.

RESISTORS come in several sizes and shapes, each one with its color code or value printed on it. The Manual calls out the value, and color code when used, of each resistor at the time it is installed.



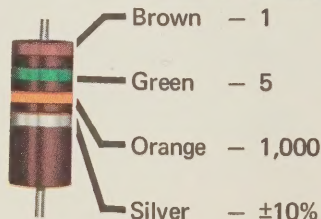
RESISTOR COLOR CODE



TOLERANCE	
Gold	5%
Silver	10%
None	20%

COLOR	1st DIGIT	2nd DIGIT	MULTIPLIER
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,000
GOLD	—	—	.1
SILVER	—	—	.01

EXAMPLES:

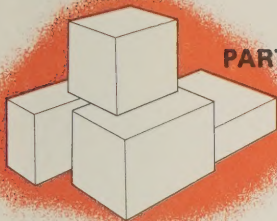


$$15 \times 1,000 = 15,000 \Omega \text{ (or } 15 \text{ k}\Omega\text{)}$$



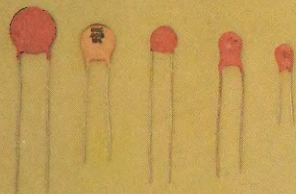
$$30 \times 100,000 = 3,000,000 \Omega \text{ (or } 3 \text{ M}\Omega\text{)}$$

PARTS

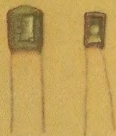


CAPACITORS also come in several sizes and shapes. Many different types of capacitors are used in Heathkit products. The Manual calls out both the type and the value of each capacitor at the time it is installed.

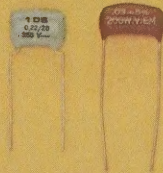
OTHER PARTS are identified with numbers and/or drawings. In every case the Manual provides you with positive identification, leaving little chance for error.



DISC



TANTALUM



MYLAR*



TRIMMER

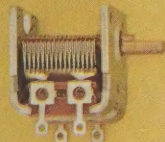


TRANSISTORS

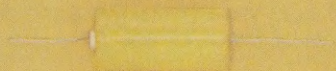


ELECTROLYTIC

VARIABLE



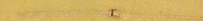
TUBULAR ELECTROLYTIC



INTEGRATED
CIRCUITS

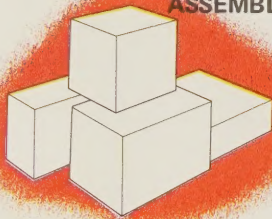


DIODES



*DuPONT REGISTERED TRADEMARK

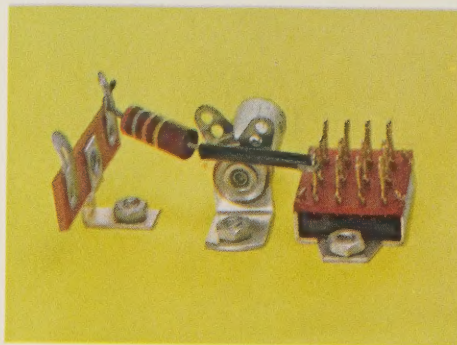
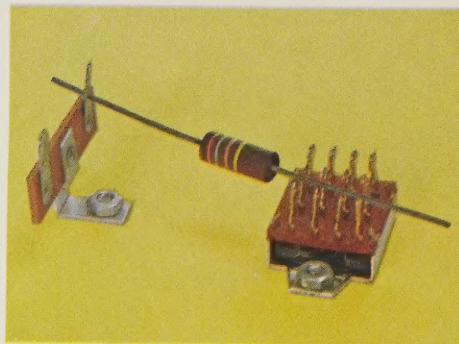
ASSEMBLY



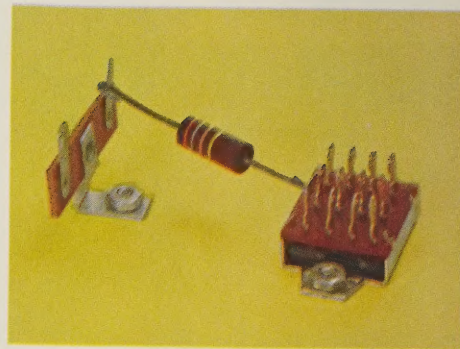
You can build top quality into your kit by carefully following the step-by-step assembly instructions. Remember. . .

- ☐ The leads on many of the parts are generally longer than necessary. Cut the leads to the proper length before installing the part.
- ☐ Hookup wire is the type with colored insulation. Use this type of wire unless the Manual calls for another type.
- ☐ To prepare hookup wire, you will normally cut it to the proper length, and then remove 1/4" of insulation from each end.

CUT THE LEADS TO THE PROPER LENGTH



USE SLEEVING WHEN CALLED FOR TO PROVIDE INSULATION



FASTEN THE LEAD ENDS

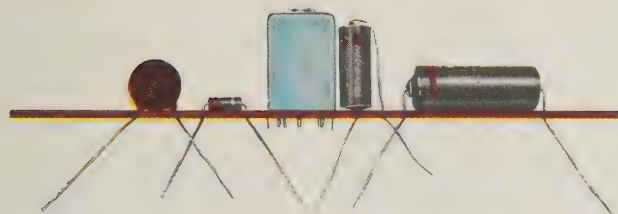


RIGHT

Chassis wiring should be as neat as possible. Position each wire and part as shown in the Manual.



WRONG



RIGHT

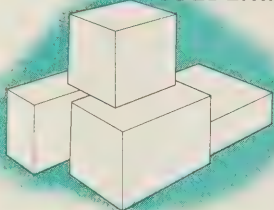
Circuit board parts should be mounted tightly against the circuit boards (unless the steps direct otherwise). The leads of each part should be inserted through the correct holes in the circuit board, and then bent slightly outward to hold the part in place.

After a group of parts has been installed, solder each lead to the foil and clip off the excess lead lengths.



WRONG

SOLDERING

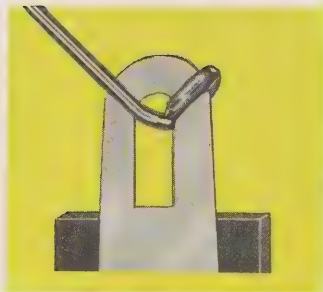


Good solder connections are **MOST IMPORTANT**: About 90% of all service problems are caused by poor soldering. Always. . .

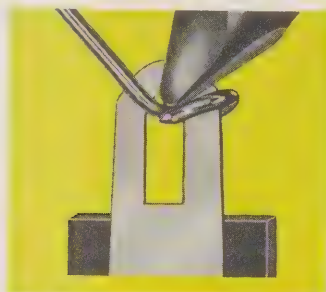
- ☐ Make sure the connection to be soldered is clean. Wax, frayed insulation, and other foreign substances cause poor connections.
- ☐ Keep your soldering iron tip clean. Wipe it often with a damp cloth or sponge.
- ☐ Notice the soldering abbreviations given in the steps. (NS) means not to solder because other wires will be added later. "S-" with a number, such as (S-3), means to solder the connection. The number following the "S" tells how many wires are at the connection. (Where a wire passes through a connection and goes on to another point, it counts as two wires.)



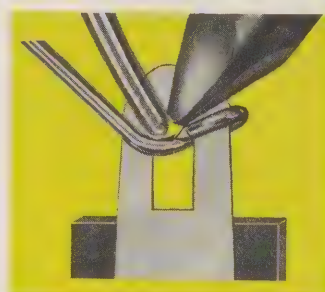
POOR CONNECTIONS LOOK CRYSTALLINE AND GRAINY, OR THE SOLDER TENDS TO BLOB.



ATTACH THE WIRE.



HEAT BOTH THE WIRE AND THE CONNECTION POINT.



APPLY SOLDER TO BOTH THE TIP AND THE CONNECTION.



LET THE CONNECTION HARDEN BEFORE MOVING THE WIRE. THEN CHECK FOR A SMOOTH, BRIGHT JOINT.

ROSIN CORE SOLDER IS SUPPLIED WITH YOUR KIT. THIS TYPE OF SOLDER MUST BE USED FOR ALL SOLDERING IN THE KIT. THE USE OF OTHER TYPES OF SOLDER VOIDS THE WARRANTY, AND WE WILL NOT SERVICE EQUIPMENT IN WHICH ACID CORE SOLDER OR PASTE FLUXES HAVE BEEN USED. IF ADDITIONAL SOLDER IS NEEDED, BE SURE TO PURCHASE ROSIN CORE (60:40 or 50:50 TIN-LEAD CONTENT) RADIO-TYPE SOLDER.

CLEAR PLUGGED HOLES BY HEATING AND PUSHING A RESISTOR LEAD THROUGH THE HOLE FROM THE OTHER SIDE.

CLEAR SOLDER BRIDGES BETWEEN FOILS BY HEATING AND QUICKLY WIPING AWAY THE MELTED SOLDER WITH A SOFT CLOTH.



HEAT BOTH WIRE AND FOIL.



APPLY SOLDER TO BOTH THE TIP AND THE CONNECTION.



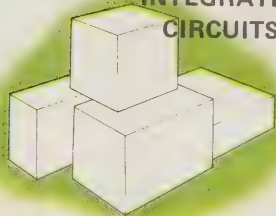
LET THE CONNECTION HARDEN BEFORE MOVING THE WIRE OR BOARD. THEN CHECK FOR A SMOOTH, BRIGHT JOINT.



CLIP OFF THE EXCESS WIRE LENGTH.



INTEGRATED CIRCUITS

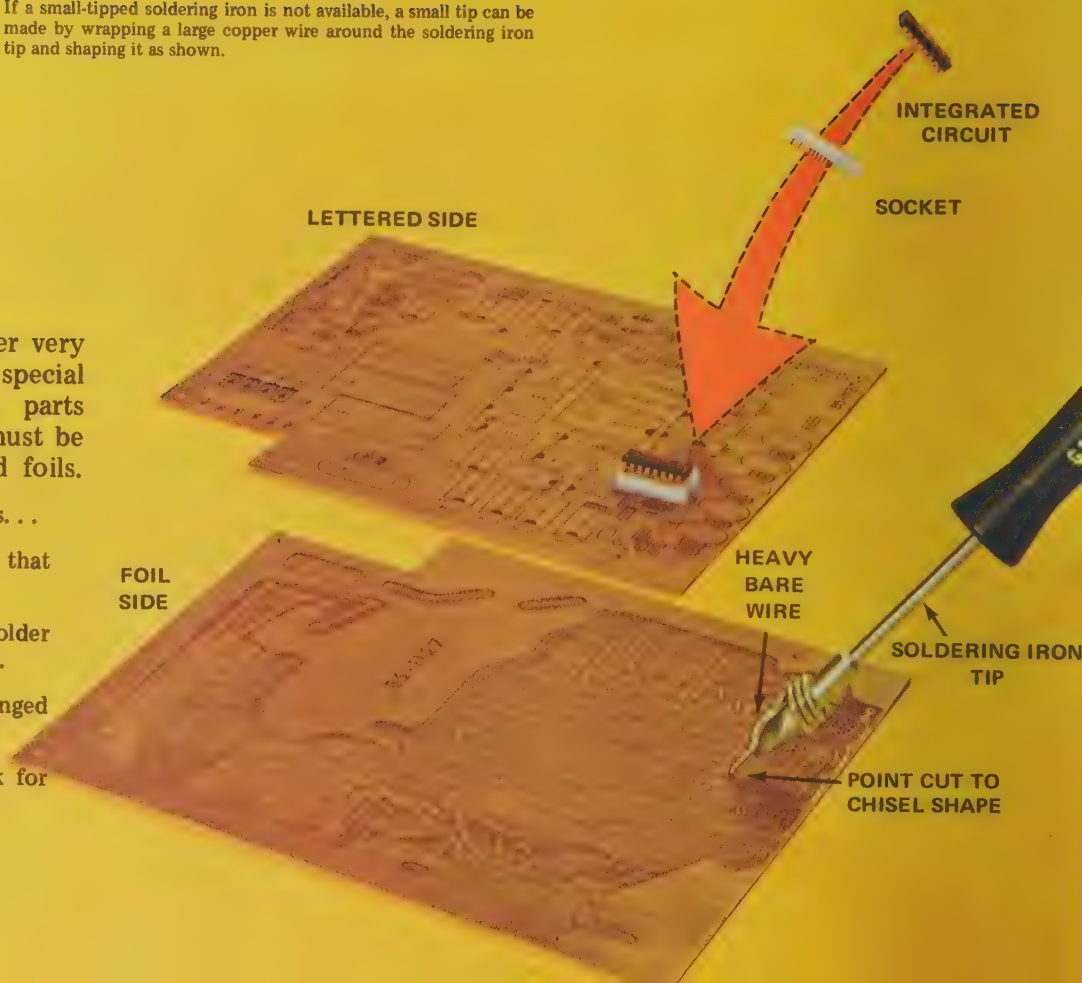


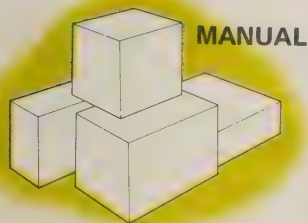
* If a small-tipped soldering iron is not available, a small tip can be made by wrapping a large copper wire around the soldering iron tip and shaping it as shown.

Integrated circuits (IC's) and other very small parts often require special soldering considerations. These parts usually have very fine leads that must be connected to small, closely spaced foils.

When mounting parts of this type, always. . .

- ☐ Use a small-tipped soldering iron that does not exceed 25 watts.*
- ☐ Use only the minimum amount of solder necessary to make a good connection.
- ☐ Avoid subjecting the parts to prolonged or excessive heat.
- ☐ Inspect the soldering area to check for solder bridges between adjacent foils.



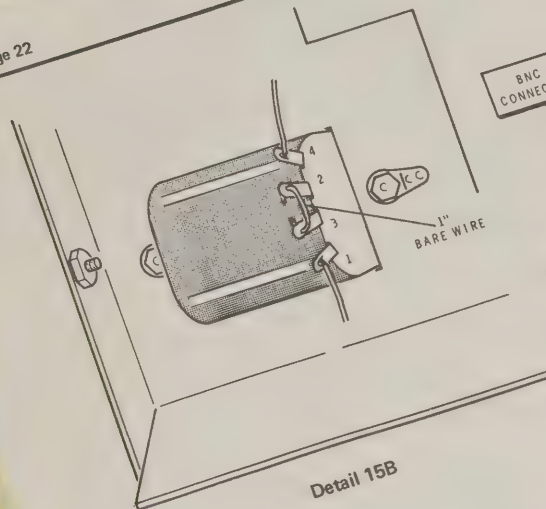


MANUAL

Your Heathkit Manual leads you step-by-step through the assembly, adjustments, and operation of your kit. All you have to do is...

- ☐ Read each step all the way through before you do the work.
- ☐ Refer to any Pictorial or Detail drawing called out in a step.
- ☐ Check the step off in the space provided (✓) when it is completed.

Page 22



Detail 15B

240 Vac Wiring

Refer to Detail 15B for the following steps.

- ✓ Solder the connection at lug 4 (S-1) of the power
- lug 1 (S-1) of the power

BNC CONNECTOR



Detail 16A

BNC NUT



BNC LOCKWASHER

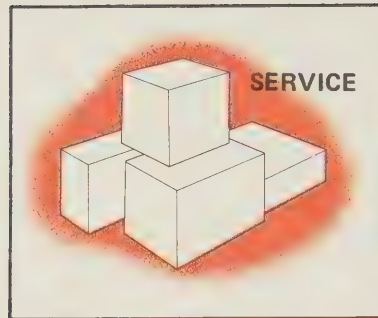


- ✓ Connect this bare wire to lug 4 (S-1) of the power transformer.
- ✓ Turn the chassis over.

FRONT PANEL ASSEMBLY

Refer to Pictorial 16 for the following steps.

- () Position the front panel.
- () Remove the label and install the label.
- () Remove the lockwasher and install the lockwasher.
- () Refer to Detail 16B. Use the lockwasher connector.



TECHNICAL CONSULTATION

Need help with any of your Heathkit equipment? If so, simply drop a line to our Technical Consultants. You'll find them eager to answer those sticky questions that sometimes pop up. Sorry, but information on special modifications just isn't available, and never send parts for testing unless they are specifically asked for.



The completeness of the answer the Consultant sends back to you depends on the completeness of the information you furnish. Be sure to include:

- The Model Number and Series Number of the kit (on blue and white identification label).*
- Date of purchase.
- An exact description of the difficulty. Include switch positions, connections to other units, operating procedures, voltage readings, and any other information you think might be helpful.
- List everything you have done in attempting to correct the difficulty.

REPLACEMENT PARTS

If a replacement part is needed, please fill in the Parts Order Form that is furnished with your kit and mail it to the Heath Company. Or, if you write a letter, include the following information:

- Part number and description as shown in the Parts List.
- Model Number and Series Number of the kit.

If your kit is in the Warranty period, add:

- Date of purchase.
- Nature of defect.

Heath Company will fill your order promptly. Please **DO NOT RETURN PARTS** unless they are requested. Parts that are damaged through carelessness or misuse by the kit builder will not be replaced without cost.

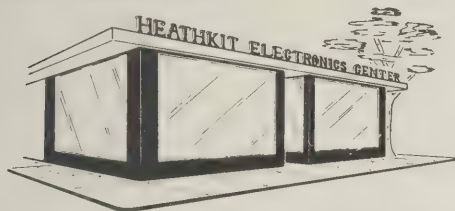
Parts are also available from your nearest Heathkit Electronic Center. These Centers are listed in your Heathkit Catalog. Service Centers require you to return the original part with your request for a replacement.

REPAIR SERVICE

Out Service Facilities are always available to repair your completed kit for a min-

*Also write in here the Model _____ and series _____

imum service fee. (Sorry, but we can't accept modified kits for repair.) Repair service is available at the factory or any Heathkit Electronic Center listed in your Heathkit Catalog. You need not ask for authorization to ship your kit for repair. Just follow the Shipping Instructions for details on how to package and ship your equipment.



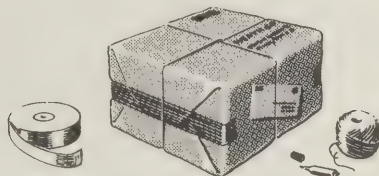
To be eligible for replacement parts as spelled out in the Warranty, we'll need your invoice or sales slip, or a copy of either. (If you send your original invoice or sales slip, we'll be sure to get it back to you.)

SHIPPING INSTRUCTIONS

Check your equipment to make sure that all the parts and screws are in place.

Then, wrap the equipment in heavy paper. Place the equipment in a strong

carton, and put at least three inches of resilient packing, such as shredded paper or excelsior, on all sides between the equipment and the carton. Special cartons are not available from Heath Company for this purpose.



Seal the carton with gummed paper tape and tie it with a strong cord. Be sure to attach a letter to the outside of the package that includes:

- Your name and address.
- Date of purchase.
- A brief description of the difficulty.
- Your authorization to ship the repaired unit back to you C.O.D. for the service and shipping charges, plus the cost of parts not covered by the Warranty.



Ship the package by prepaid Express or insured Parcel Post to:

HEATH COMPANY
Benton Harbor, Michigan 49022

... world leader in electronic kits

THE STORY OF HEATH. Edward Bayard Heath founded the Heath Aeroplane Company during the early 1900's. In 1926 he produced an airplane in kit form—the famous Heath “Parasol.” For years this light aircraft was a favorite in the flying fraternity. Mr. Heath was killed during a test flight in 1931, marking a tragic end to a brilliant career. From that point through World War II, the Heath Company remained in the aircraft and replacement parts business.

Shortly after World War II, the character of the Heath Company changed. An ambitious engineer named Howard Anthony, who had purchased the Heath Company in 1935, took a calculated gamble. The ingenious Mr. Anthony bought a large stock of surplus wartime electronic parts, designed and “mail order marketed” an oscilloscope kit for \$39.50.

Mr. Anthony based the success of his idea on the premise that anyone, regardless of technical knowledge or skills could assemble a kit himself, and save up to 50% over comparable factory-built models. All that would be required were a few simple hand tools and some spare time.

Orders poured in for the oscilloscope kit, and the foundation for the Heath Company as it exists today was established. Mr. Anthony expanded his test instrument line and soon added amateur radio and hi-fi component kits.

Tragedy struck again in 1954 when Howard Anthony was also killed in an airplane crash. Daystrom, Inc. then acquired the Heath Company. In 1962 Daystrom, Inc. was purchased by Schlumberger Limited, a leader in the development of electronic techniques for oil exploration.



Since 1954, more kit products have been added until at present Heath boasts 14 different product lines, consisting of over 300 kits . . . the world's largest selection.

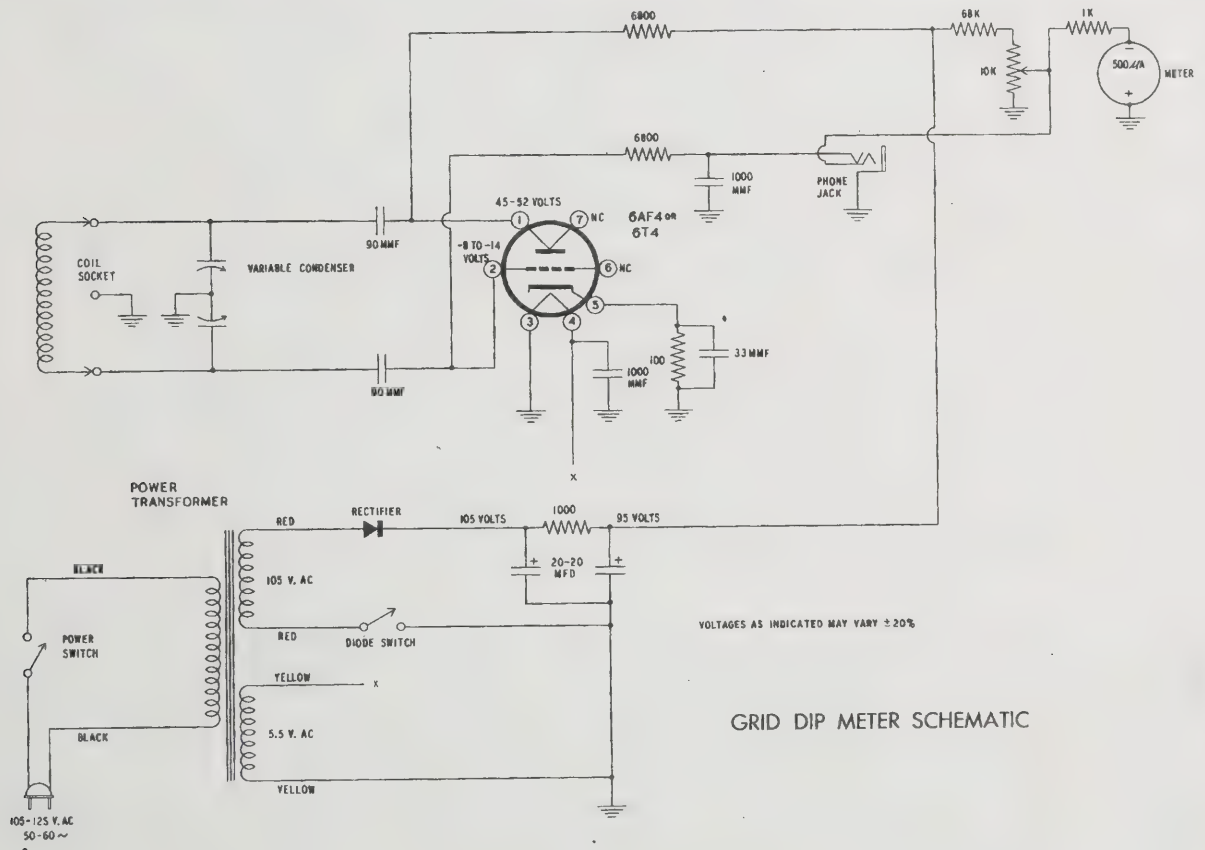
In order to produce the vast array of Heathkit equipment, a modern 383,000 sq. ft. plant was constructed on the shores of Lake Michigan in St. Joseph, Mich. If you are planning a visit to Michigan, we invite you to stop in and pay us a visit. We're located on Hilltop Rd. just off Business route I-94, south of St. Joseph, Michigan.

HEATHKIT GRID DIP METER MODEL GD-1B

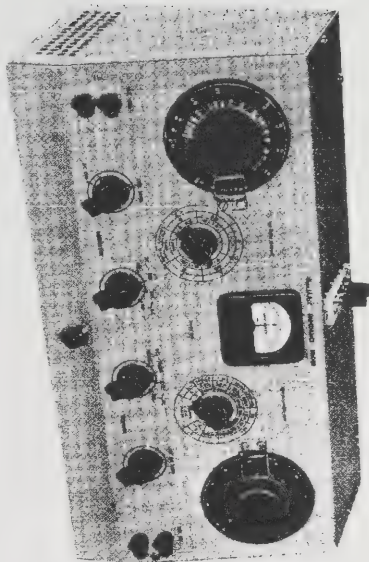


SPECIFICATIONS

Frequency Range.....	2 to 250 mc using five coils. Additional coils available; extending frequency to 350 kc.
Meter Movement.....	500 microampere
Power Requirement.....	117 volt, 5 watts, 50/60 cycle
Power Supply.....	Transformer operated selenium rectifier
Dimensions.....	7" long x 2 1/2" wide x 3 1/4" deep
Shipping Weight.....	4 lbs.
Net Weight.....	2 lbs.

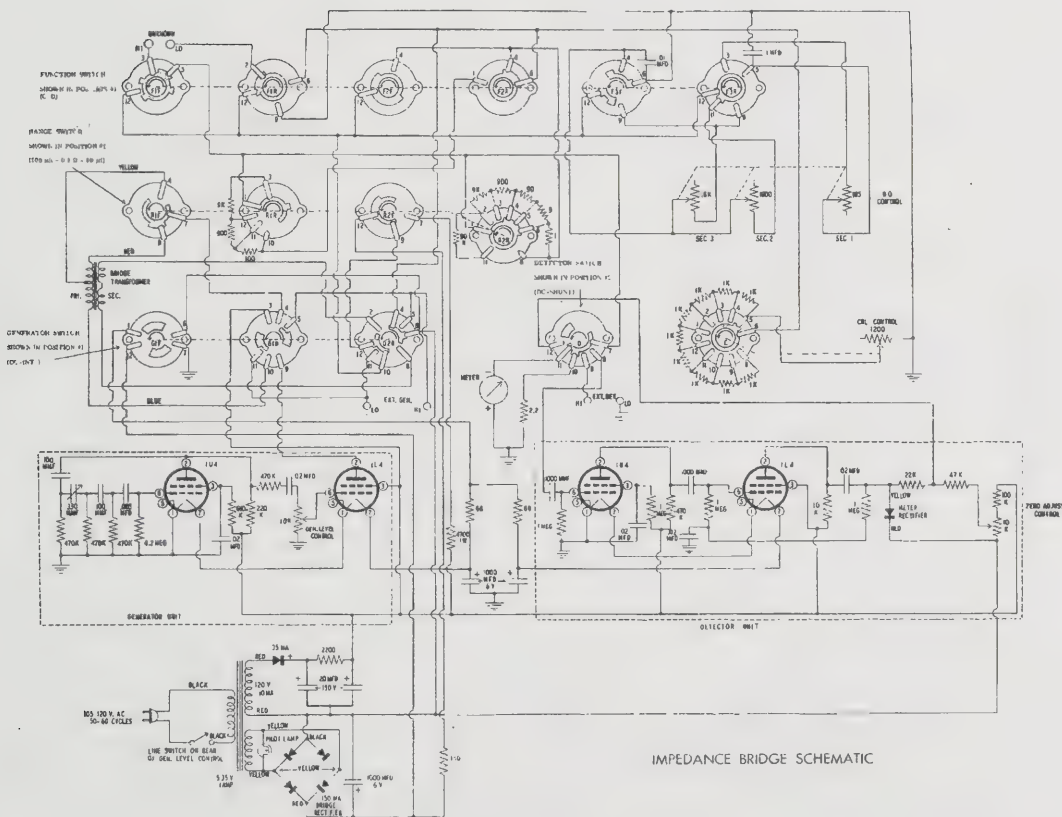


HEATHKIT IMPEDANCE BRIDGE MODEL IB-2

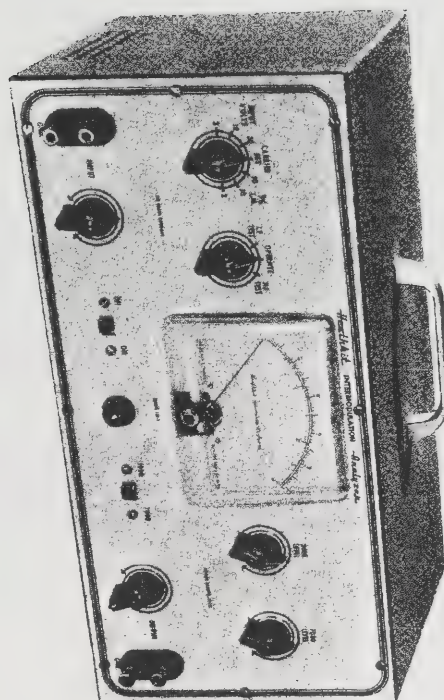


SPECIFICATIONS

Circuit.....	4-arm impedance bridge
DC Measurements.....	Built-in power supply operating directly from 110 V AC. Panel binding posts provide for use of external supply.
Meter.....	100-0-100 microampere meter
AC Measurements.....	Built-in 1000 cycle vacuum tube oscillator. Terminals on panel provide for connecting an external generator for measurement at other frequencies.
Detector.....	Vacuum tube detector and rectifier make use of built-in meter. Panel binding posts provide for connection to external detector.
Resistance.....	0.1 Ω to 10 megohm
Capacitance.....	10 μf to 100 μf
Inductance.....	10 μh to 100 h
Dissipation Factor (D).....	0.002 to 1
Storage Factor (Q).....	0.1 to 1000
Accuracy.....	1/2 or 1% decade resistors used. 1/2 of 1% silver mica condensers used. Accuracy is limited more by interpretation of scales and workmanship of assembly. The following is normal:
	Resistance $\pm 3\%$
	Capacitance $\pm 3\%$
	Inductance $\pm 10\%$
	Dissipation Factor (D= w/R) $\pm 20\%$
	Storage Factor (Q= $w/L/R$) $\pm 20\%$
	Accuracy will fall off at extreme outer limits.
Power Requirements.....	105-125 volts, 50/60 cycles, 10 watts
Tube Complement.....	2 - 1U4 and 2 - 1L4
Power Supply.....	Power Transformer and Selenium Rectifier
Cabinet Size.....	8" high x 17" wide x 6" deep
Shipping Weight.....	15 lbs.

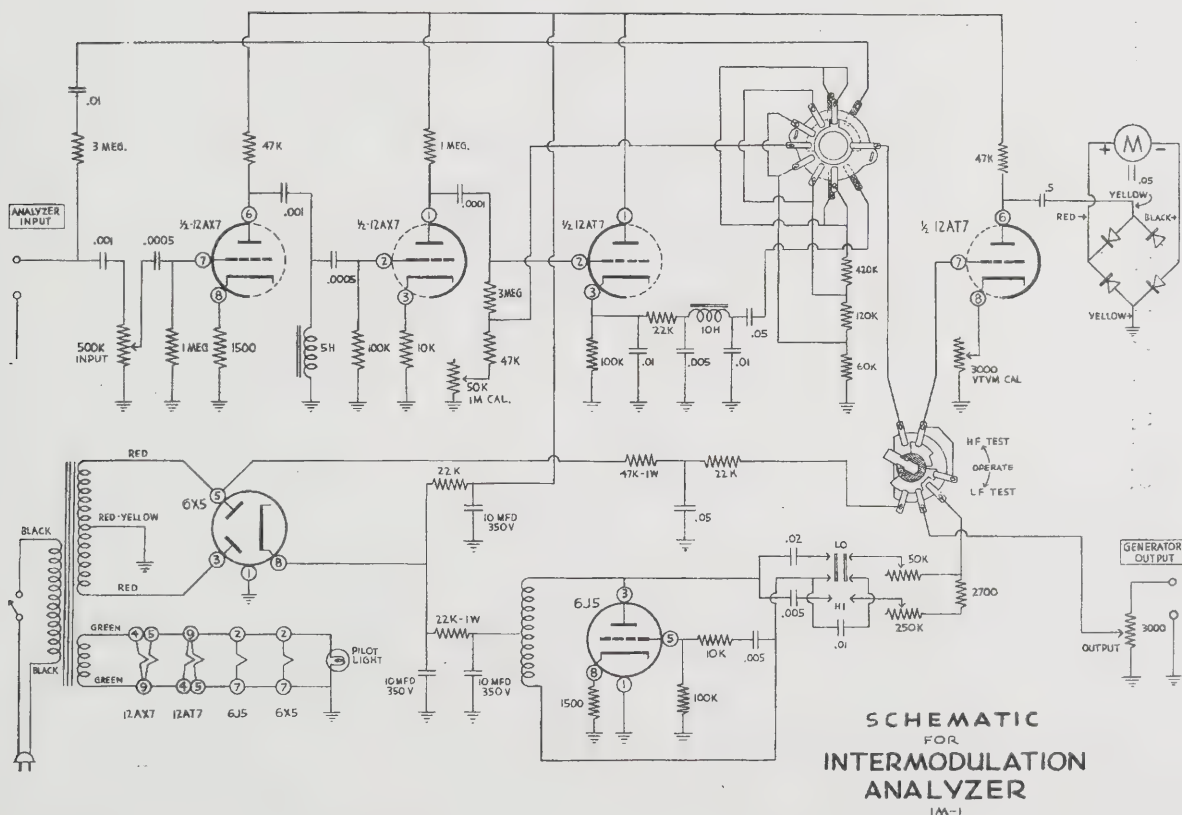


HEATHKIT INTERMODULATION ANALYZER MODEL 1M-1

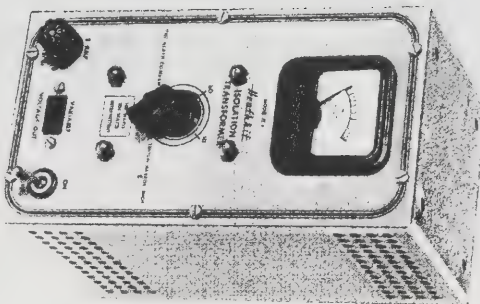


TECHNICAL SPECIFICATIONS

Power Requirements:	105-125V AC, 50-60 cycles, 30 Watts (115-230V on export model)
Tube Complement:	1 12AX7 Cascade Amplifier 1 12AT7 Detector and Meter Amplifier 1 6X5 HF Oscillator 1 6X5 Rectifier Full Scale 30% - 10% - 3% 60 cycles (Line Frequency) Approx. 3000 and 7000 cycles 4 to 1 voltage normal—can be set to any combination.
Analyzer Ranges:	3000 ohms Full Scale 30 Volts - 10 Volts - 3 Volts Dimensions: 7" high x 15" wide x 8" deep Shipping Weight: 10 lbs.
Generator Output Impedance:	
Voltmeter Ranges:	
Dimensions:	
Shipping Weight:	



HEATHKIT ISOLATION TRANSFORMER MODEL IT-1

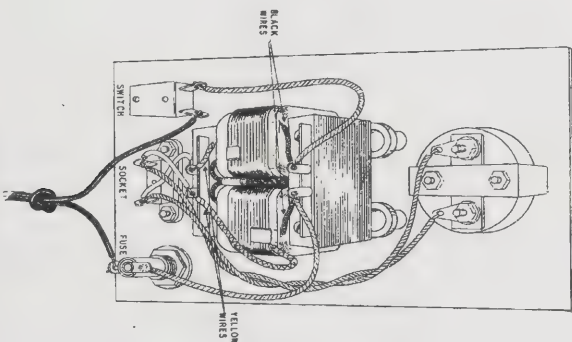


APPLICATIONS

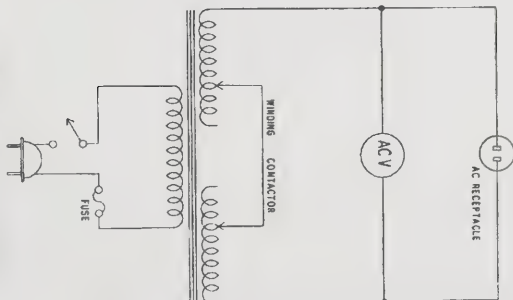
The Heathkit Isolation Transformer will fulfill a multitude of requirements in service shops. Not only will it provide isolation for universal or transformerless type radios and thereby eliminate shock hazard, it will also provide a means of increasing the AC voltage applied to the radio. In this manner, intermittent conditions of operation can be detected by applying higher than normal voltages and thereby inducing a breakdown in the component affected. While this does not necessarily represent the universal solution to intermittent operation difficulties, it will prove extremely helpful in eliminating some of the more common faults.

It is possible that many other applications of the Isolation Transformer will suggest themselves to the user; i.e., it can be used to isolate interference radiating devices from the AC line thereby reducing interference level. It can also be used in checking fluorescent lamp starters by determining the voltage level required for operation. Small motors or appliances may have their operating characteristics altered through the use of a variable voltage isolation transform-

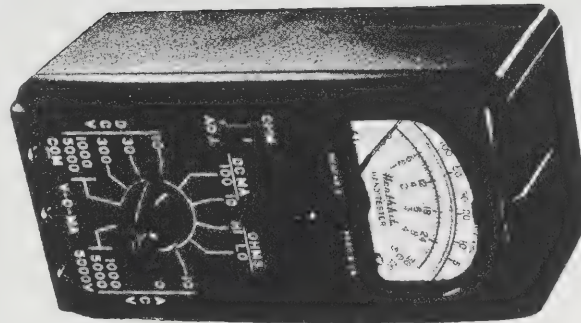
WIRING PICTORIAL



HEATHKIT ISOLATION TRANSFORMER
MODEL IT-1

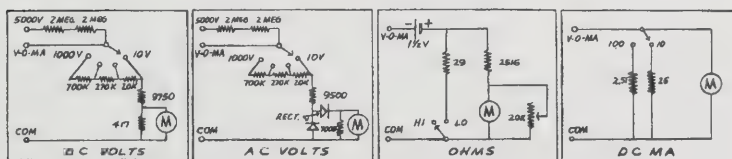
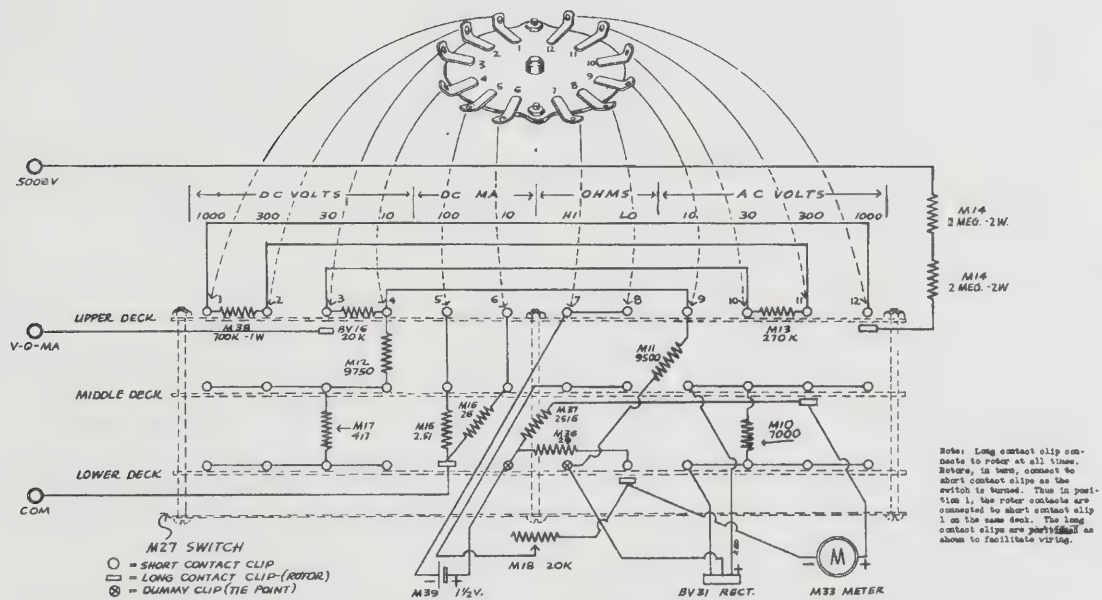


HEATHKIT HANDITESTER MODEL M-1



SPECIFICATIONS

Range DC Volts..... Full scale 10-30-300-1,000 and 5,000 Volts
 Range AC Volts..... Full scale 10-30-300-1,000 and 5,000 Volts
 Range Ohmmeter..... 0-3,000 Ohms 30 Ohms Center
 Range Milliamperes..... 0-300,000 Ohms 30 Ohms Center
 Meter Movement..... 0-10 MA 0-100 MA
 AC Rectifier..... 400 Microampere 3"
 Accuracy..... 1% divider and calibrating resistors provided
 Case..... Streamline Bakelite
 Ohmmeter Battery..... Burgess No. 1 Uniclee Flashlight Battery

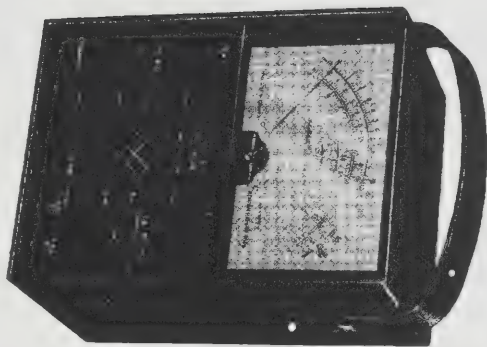


FUNCTIONAL CIRCUIT DIAGRAMS • HEATHKIT HANDITESTER

Heathkit
HANDITESTER KIT
 MODEL M-1

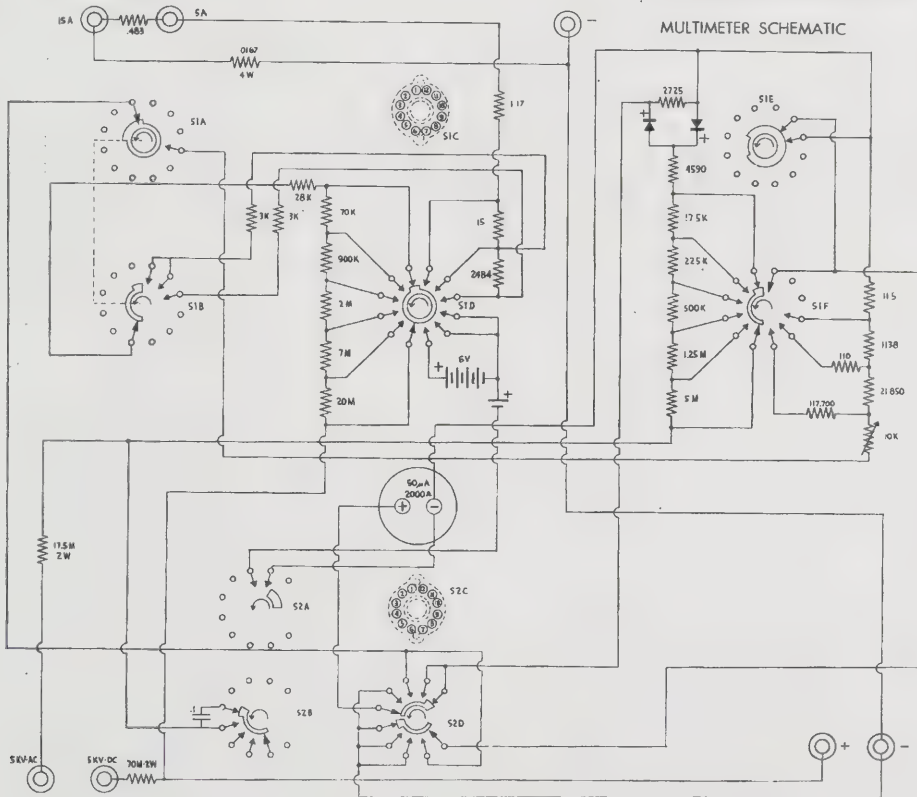
The HEATH COMPANY
 BENTON HARBOR, MICH.

HEATHKIT MULTIMETER MODEL MM-1

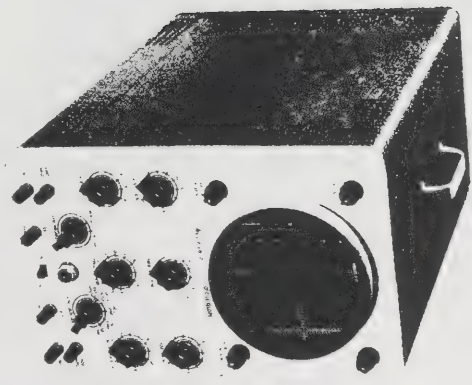


SPECIFICATIONS

Sensitivity.....	20,000 ohm/volt DC, 5000 ohm/volt AC
Range, DC Volts.....	1.5 - 5 - 50 - 150 - 500 - 1500 - 5000
Range, AC Volts.....	1.5 - 5 - 50 - 150 - 500 - 1500 - 5000
Range, Direct Current.....	150 microamperes, 15 - 150 - 500 milliamperes, 15 amperes
Range, Ohmmeter.....	0.2 ohms to 20 megohms
Range, Decibels.....	-10 to +65 db
Resistors.....	1% precision type
Controls.....	Range switch, Output AC-DC-Reverse DC switch, Ohms adjust control
Batteries.....	1 type C cell, 4 Penlite cells
Cabinet.....	Black Bakelite™
Dimensions.....	7 1/2" x 3 1/2" x 4"
Net Weight.....	4 lbs.
Shipping Weight.....	6 lbs.

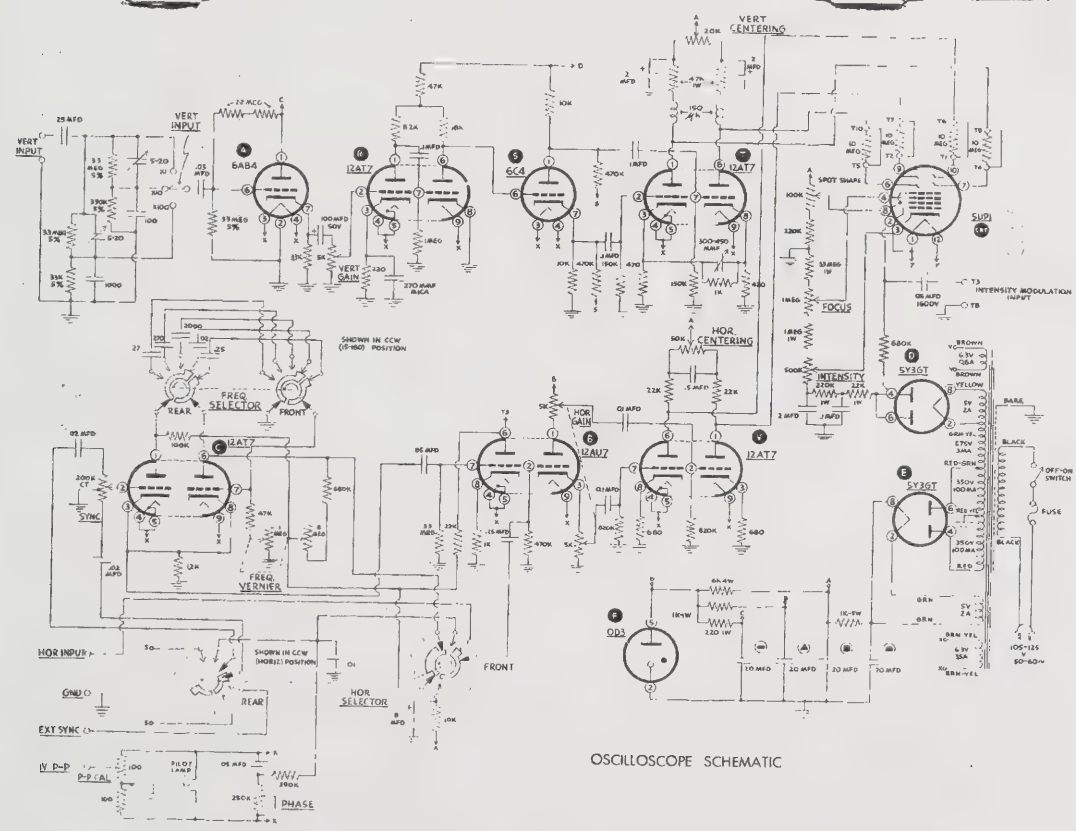


HEATHKIT OSCILLOSCOPE MODEL O-9



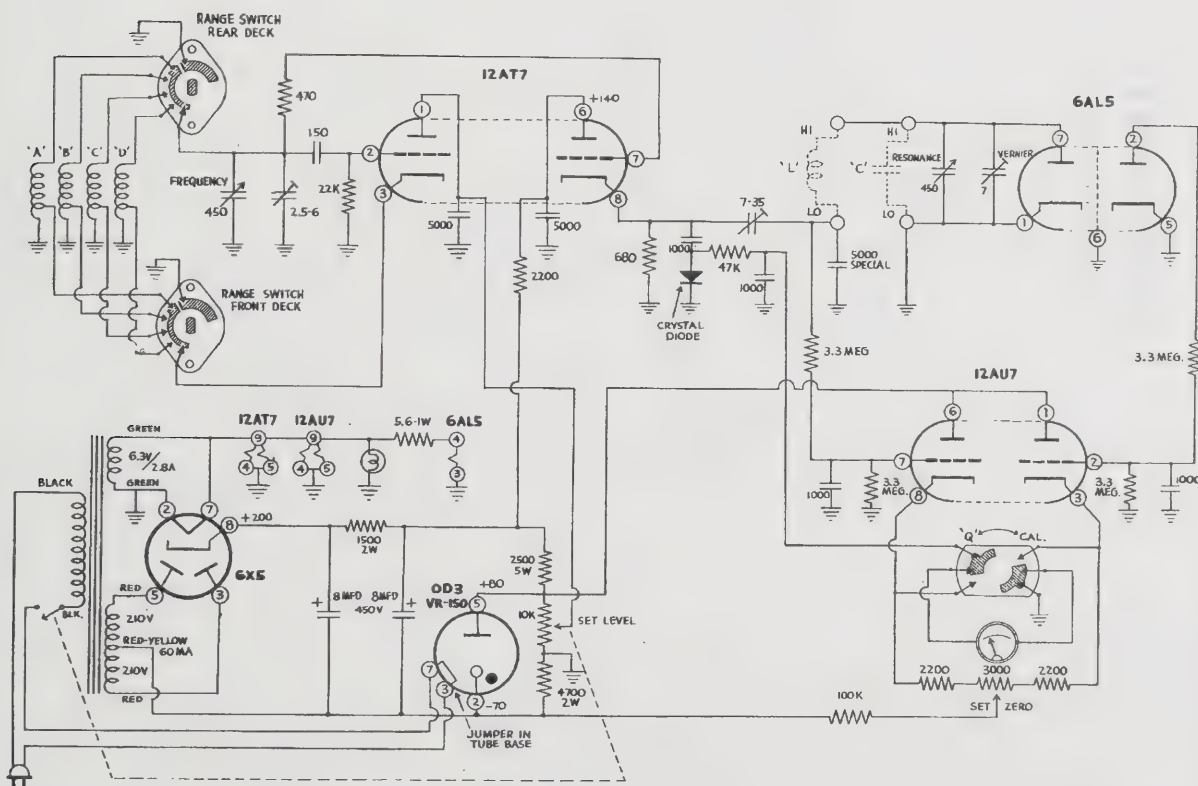
SPECIFICATIONS

- Vertical: Frequency Response..... ± 2 db 10 cycles to 2 mc
 ± 6 db 5 cycles to 3 mc
 Sensitivity..... 0.025 volts per inch at 1 kc
 Input Impedance..... 47 μ uf shunting 2 megohm XI position
 Horizontal: Frequency Response..... ± 8 db 10 cycles to 500 kc
 Sensitivity..... 0.6 volts per inch at 1 kc
 Input Impedance..... 25 μ uf shunting 1 megohm
 Sweep Generator..... Multivibrator - frequency range of 10-50,000 cps
 Tube Complement.....
 1 - 50P1 Cathode Ray Tube
 1 - 6AB4 Vertical Input
 1 - 12A17 Horizontal Input and Blanking
 1 - ODS Regulator
 1 - 6C4 Vertical Phase Splitter
 4 - 12AT7 Multivibrator, Vertical Cascade Amplifier, Horizontal and Vertical Deflection Amplifiers, Horizontal and High Voltage Rectifiers
 2 - 5Y3GT Low and High Voltage Rectifiers
 Power Requirements..... 105-125 volts 50/60 cycle, 70 watts
 Dimensions..... 8 5/8" wide x 14 1/8" high x 16" deep
 Net Weight..... 18 1/2 lbs.
 Shipping Weight..... 26 lbs.



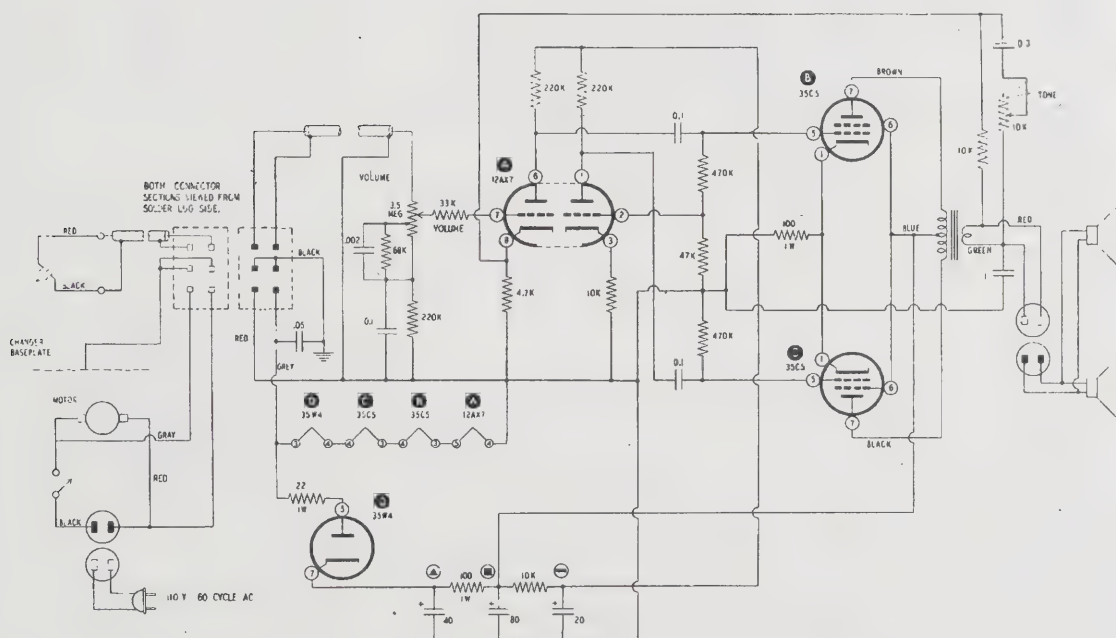
OSCILLOSCOPE SCHEMATIC

Power Requirements	115 volts AC 50/60 cycles 30 watts
Tube Complement	1 - 12AT7 Oscillator 1 - 6AL5 VTYM diode 1 - 12AU7 VTYM amplifier 1 - OD3/VRI50 Regulator 1 - 6X5 Rectifier
Frequency Range	150 KC - 18 MC
Inductance Scale Range	1 micro H. - 10 milli H.
Actual Capacity Scale Range	40 MMF - 450 MMF
Effective Capacity Scale Range	40 MMF - 400 MMF
Vernier Capacity Scale Range3 MMF - +3 MMF
"Q" Scale Range250 Full scale x1 or x2
Dimensions	8" high x 17" wide x 6" deep



Tube Complement.....	12AX7 Voltage Amplifier and Phase Splitter 2 - 35C5 Push-Pull Power Amplifiers
Controls.....	35W4 Rectifier Compensated Volume Control Separate Tone Control
Power Requirements.....	117 volt 60 cycle AC, 45 watts

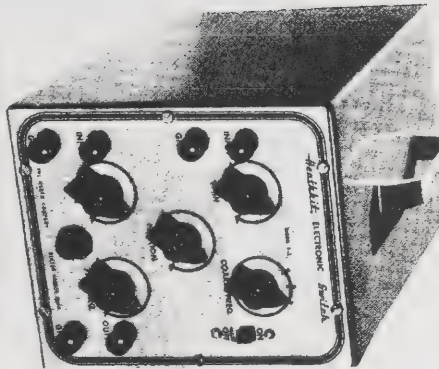
Record Changer.....	Three speed, automatic shut-off
Speakers.....	2 - 6" matched
Cabinet.....	Plexylin Impregnated Fabric Covered
Dimensions.....	16 3/4" x 12 1/4" x 10 1/2" high
Shipping Weight.....	30 lbs.



HEATHKIT RECORD PLAYER

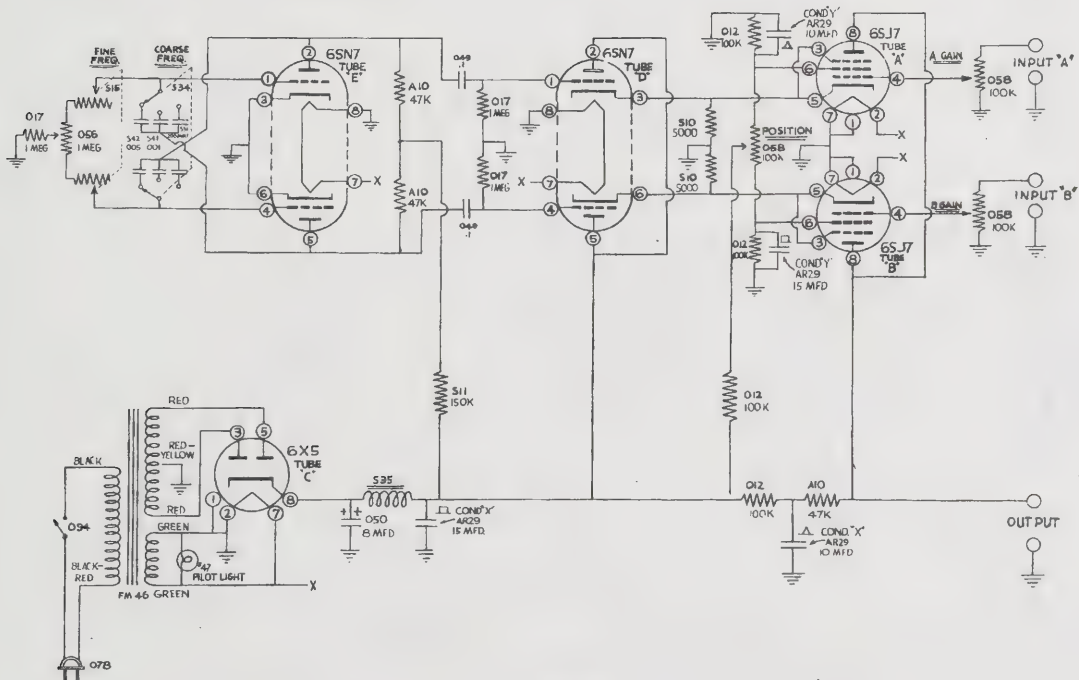
MODEL RP-1

Heathkit Electronic Switch Model S-2



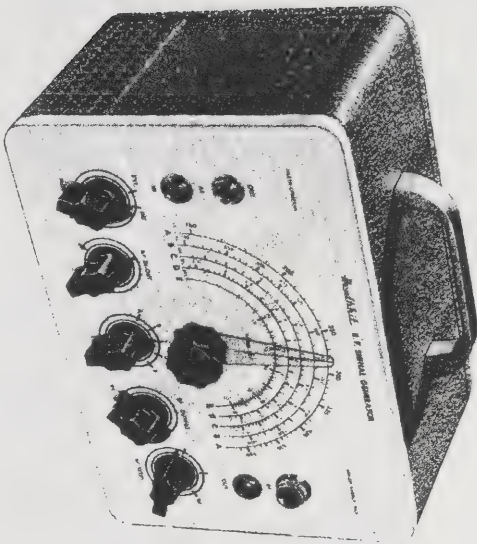
TECHNICAL SPECIFICATIONS

Input Voltage	110-125V AC 50-60 cycles
Power Consumption	25 Watts
Tube Complement:	
1.	6X5 (GT) Rectifier
1.	6SN7 (GT) Multivibrator
1.	6SN7 (GT) Blocking Tube
1.	6SH7 (GT) or 6SJ7 (GT) A Amplifier
1.	6SH7 (GT) or 6SJ7 (GT) B Amplifier
Control Line Up:	
Gain A Control	Coarse Frequency Control
Gain B Control	Fine Frequency Control
Position Control	
Approximate Switching Rates: (Continuously variable)	
Low range: Less than 10 Cps. to 100 Cps.	
Middle range: 50 Cps. to 400 Cps.	
High range: 250 Cps. to 2000 Cps.	
Physical Specifications:	
Length (excluding knobs)	10 1/8"
Width	5 5/8"
Height (excluding handle and feet)	8 5/8"
Net Weight	8 lbs.
Shipping Weight	10 lbs.



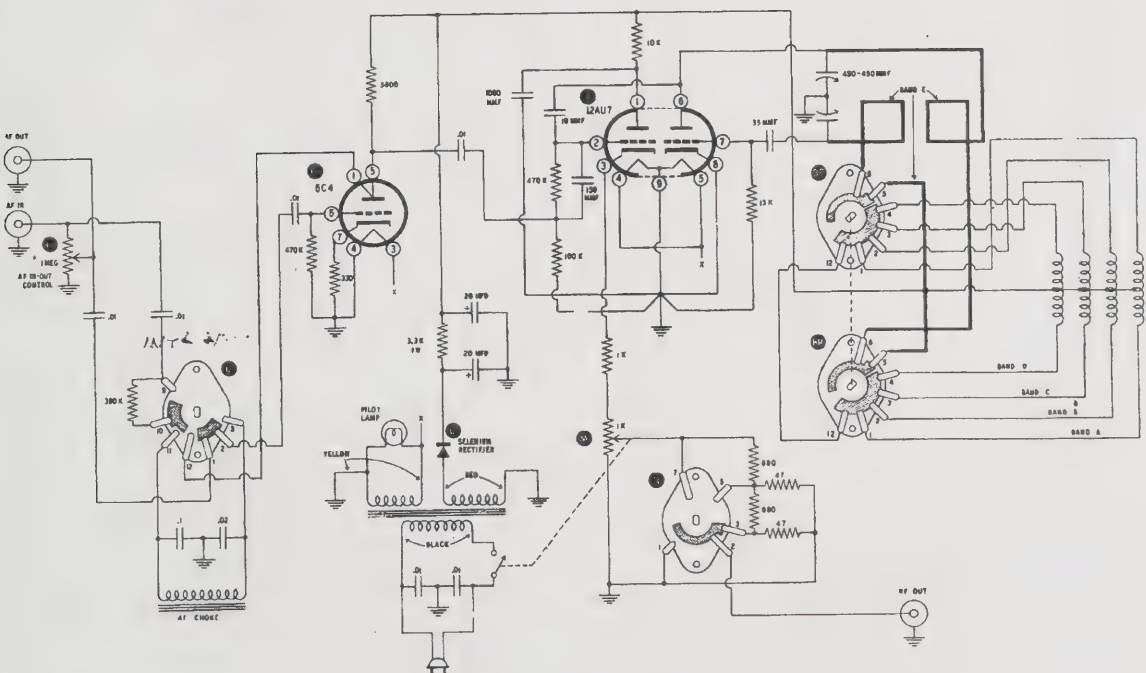
Schematic

MODEL SG-8

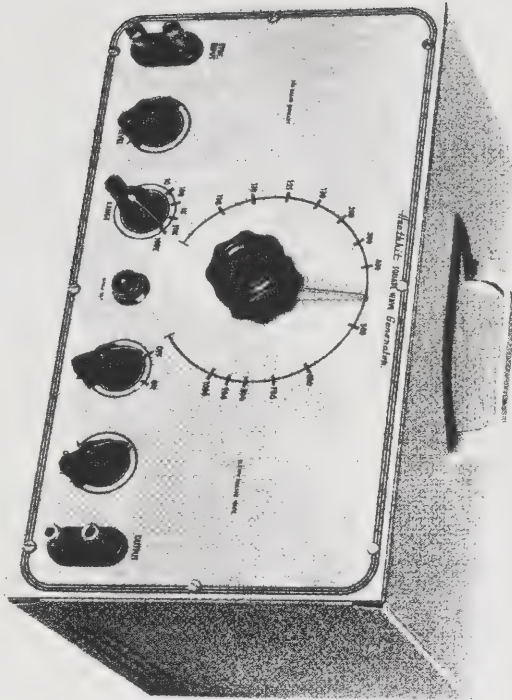


SPECIFICATIONS

Frequency Range	
Band A.....	160 kc to 500 kc
Band B.....	500 kc to 1650 kc
Band C.....	1.65 mc to 6.5 mc
Band D.....	6.5 mc to 25 mc
Band E.....	25 mc to 110 mc
Calibrated Harmonics.....	110 mc to 220 mc
Radio Frequency Output.....	In excess of 100,000 microwatts
Modulation Frequency.....	Approximately 400 cycles
Audio Output.....	2 to 3 volts
Audio Frequency Input.....	Approximately 5 v across 1 megohm
Tubes	
12AU7.....	RF Oscillator-Buffer
6C4.....	Audio Oscillator or Audio Amplifier
Power Requirements.....	105-125 v, 50/60 cycles
Cabinet Size.....	9 1/2 wide x 6 1/2 high x 5 deep
Shipping Weight.....	7 lbs.



HEATHKIT SQUARE WAVE GENERATOR MODEL SQ-1



TECHNICAL SPECIFICATIONS

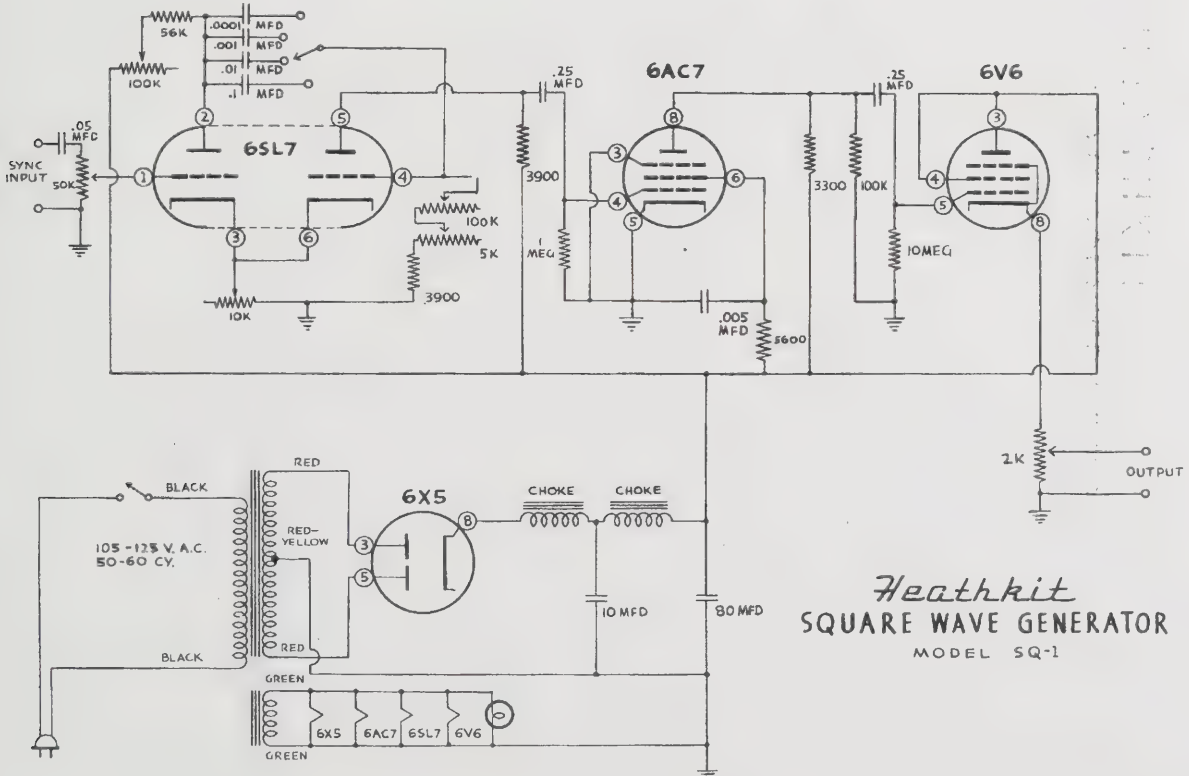
Power Requirements:
105-125 VAC, 50-60 Cycle, 10 Watts

Ranges:
100 - 1000 - 10 KC - 100 KC

Tube Complement:
1 - 6SL7, 1 - 6AC7, 1 - 6V6, 1 - 6X5

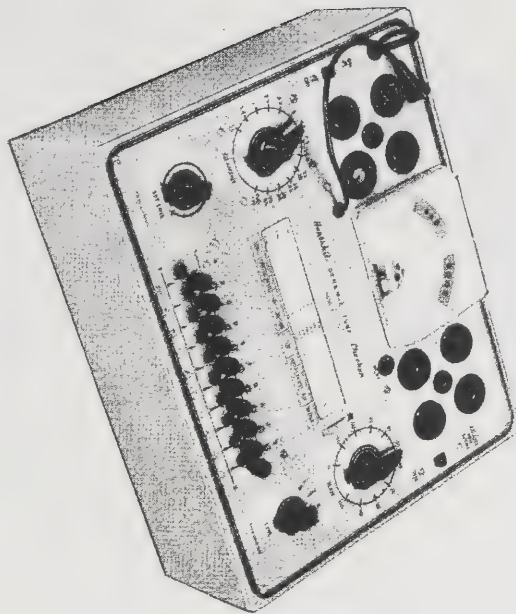
Physical Specifications:
13½" Long, 7" High, 7½" Deep

Shipping Weight 13 lbs.
Net Weight 11 lbs.



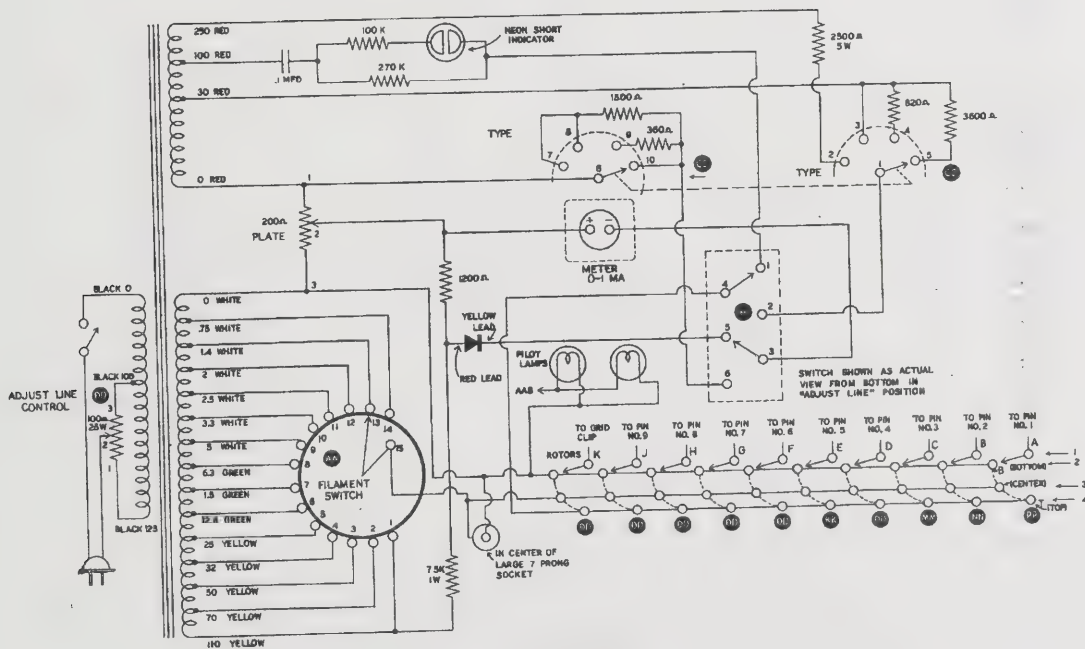
Heathkit
SQUARE WAVE GENERATOR
MODEL SQ-1

HEATHKIT TUBE CHECKER MODEL TC-2



SPECIFICATIONS

Simplified set-up procedure.
Rapid switch selection of individual tube elements.
Any combination of base pin connections.
Check for quality, emission, shorted elements, open elements, and filament continuity.
Checks 4, 5, 6, and 7 pin large, regular and miniature, octal, locial, Hytron, 9 pin miniature and pilot lamps.
Individual tests on multiple element tubes.
Blank panel socket for obsolescence protection.
Compensation for line voltage variation.
New smooth rolling illuminated roll chart.
Easy to read GOOD-BAD meter scale.
Fourteen filament voltages - .75 to 117 volts
Element Test Voltages.....0-250 volts
Dimensions.....14" wide x 11" deep x 4 1/4" high
Power Requirements.....105-125 volts 50/60 cycles AC



SCHEMATIC
HEATHKIT TUBE CHECKER
Model TC-2

High gain RF channel for direct observation of actual transmitted signal. Can be used for AM, FM and TV circuit investigation.

FM and TV circuit investigation.

Low gain channel for audio circuit exploration.

Visual signal indicator.

Convenient wattmeter circuit.

Noise locator circuit

Utility amplifier for checking record changers, tuners, etc.

Useful for checking microphones, musical instrument pickups and speakers.

Substitution test speaker a

Oscilloscope preamplifier

VTVM panel to

12C8 amplifier and wattmeter rectifier.

12SH7 high gain pentode amplifier.

12A6 beam power output.

1629 electron beam visual indicator.

6X5 full-wave rectifier.

Shielded RF probe and lead.

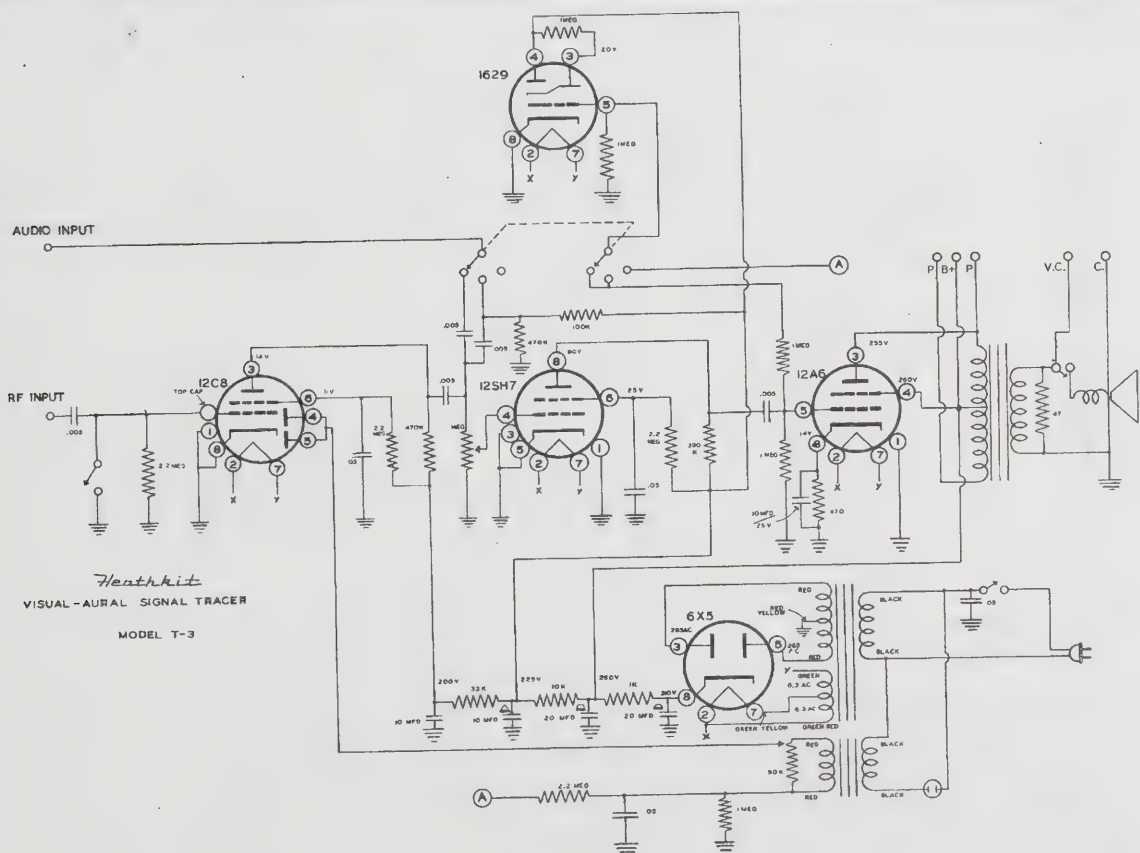
Audio probe and lead.

Two flexible panel test leads with alligator clips

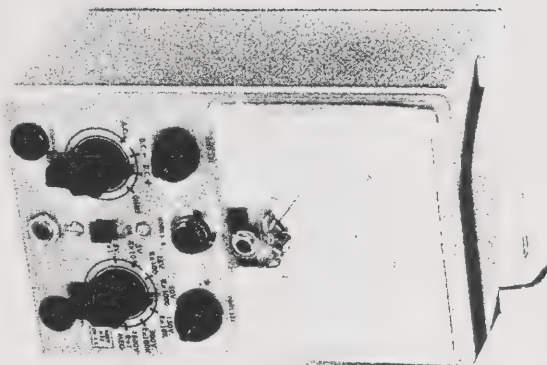
Cabinet size $9\frac{1}{2}$ " wide $6\frac{1}{2}$ " high 5" deep.

Shipping weight 8 pounds.

Power requirements 110 to 120 volts AC at 50-60 cycles.

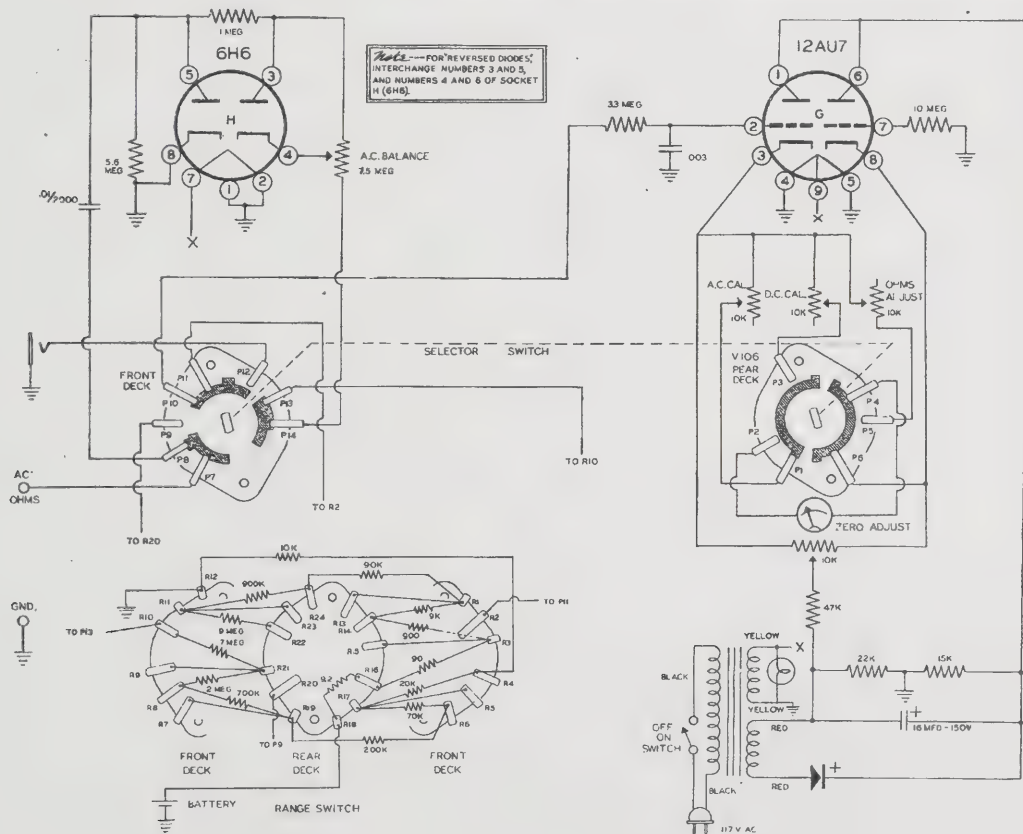


HEATHKIT VTVM MODEL V-6

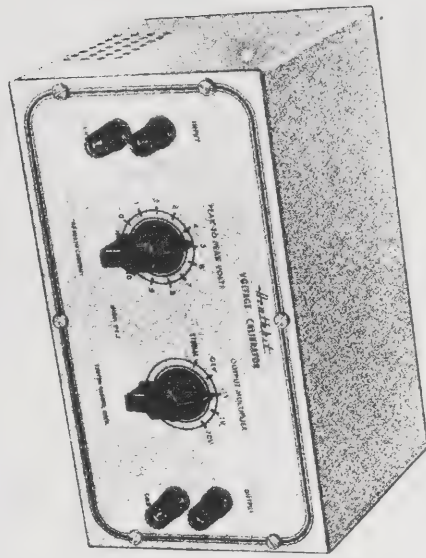


SPECIFICATIONS

Power Requirements:	105-125V 50/60 Cycle AC, 10 Watts.
Cabinet Size:	7 3/8" high x 4 11/16" wide x 4 1/8" deep.
Kit Shipping Weight:	7 pounds
Meter:	4 1/2" Streamlined case with 200 microampere movement.
Multipliers:	Precision type.
Tubes:	1 - 12AU7 Twin triode meter bridge. 1 - 6H6 Twin diode AC rectifier.
Power Supply:	Power transformer and selenium rectifier.
Battery:	1 1/2 Volt flashlight cell
D. C. Voltmeter: 7 Ranges:	0-1.5, 5, 15, 50, 150, 500, 1500 volts full scale. With accessory probe to 30,000 Volts.
Input Resistance:	11 Megohms (1 megohm in probe) on all ranges.
Sensitivity:	1,100 megohms with accessory probe.
Circuit:	7,333,333 ohms per volt on 1.5 Volt range.
Electronic AC Voltmeter: 7 Ranges:	Balanced bridge (push-pull) using twin triode. 0-1.5, 5, 15, 50, 150, 500, 1,500, (1000V Max.) Scales reading R.M.S. (.707 of positive peak).
Circuit:	Diode with adjustable compensation.
Electronic Ohmmeter: 7 Ranges:	Scale with 10 ohms center x1, x10, x100, x1000, x10K, x100K, x1 Meg. Measures .1 ohm to 1,000 megohms with internal battery.

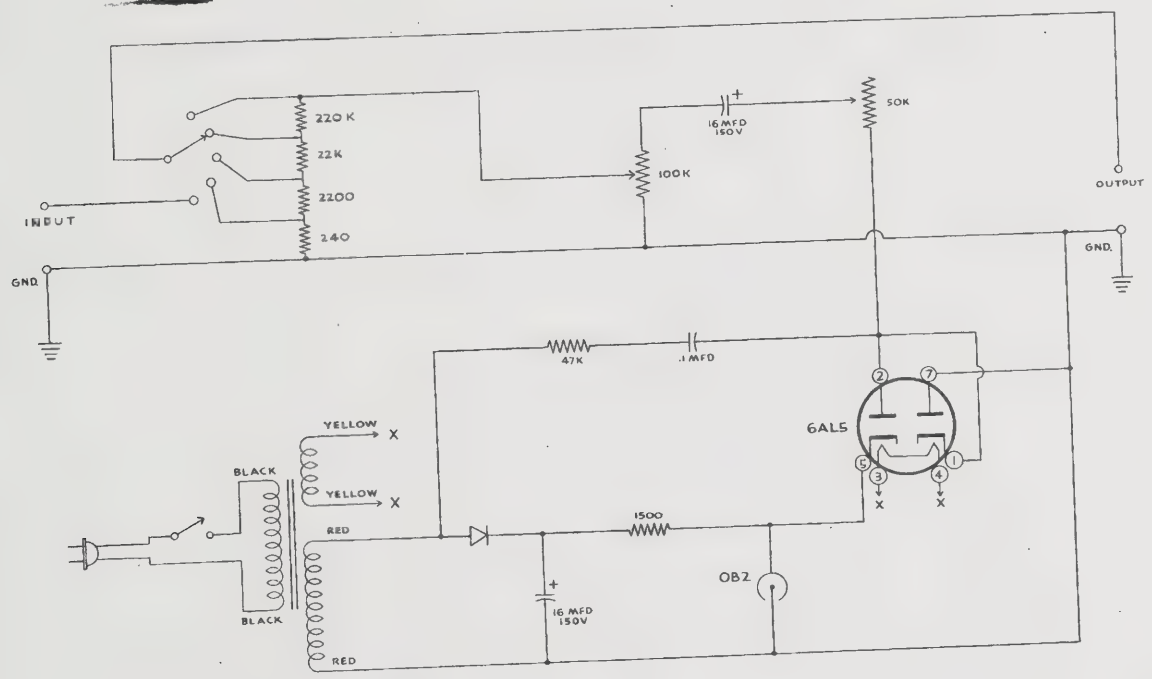


MODEL VC-2 VOLTAGE CALIBRATOR



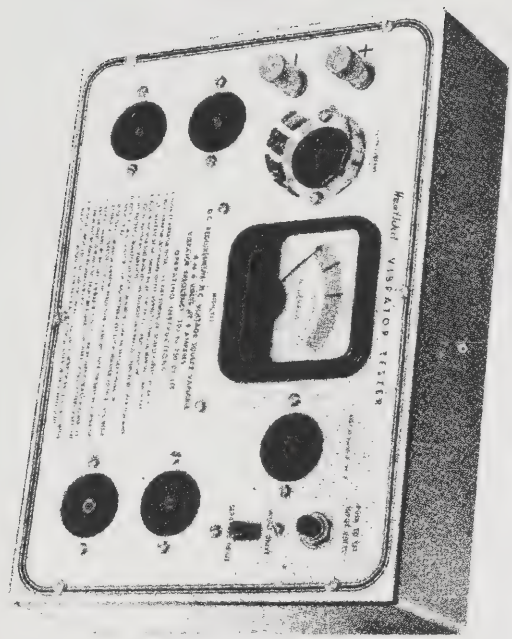
SPECIFICATIONS

- Power Requirements: 105-125V AC, 50-60 Cycles, 5 Watts.
- Tube Complement: 1 6AL5 Clipper, 1 OB2 Voltage Regulator.
- Input Impedance: Approx. 25 MMF with signal fed through calibrator
- Ranges: Using Peak-To-Peak Volts
Control and Output Multiplier switch
 - 0 - 1 Volt
 - 0 - 10 Volts
 - 0 - 100 Volts
- Cabinet Dimensions: 8 1/8" Wide x 4 3/8" High x 4 7/8" Deep



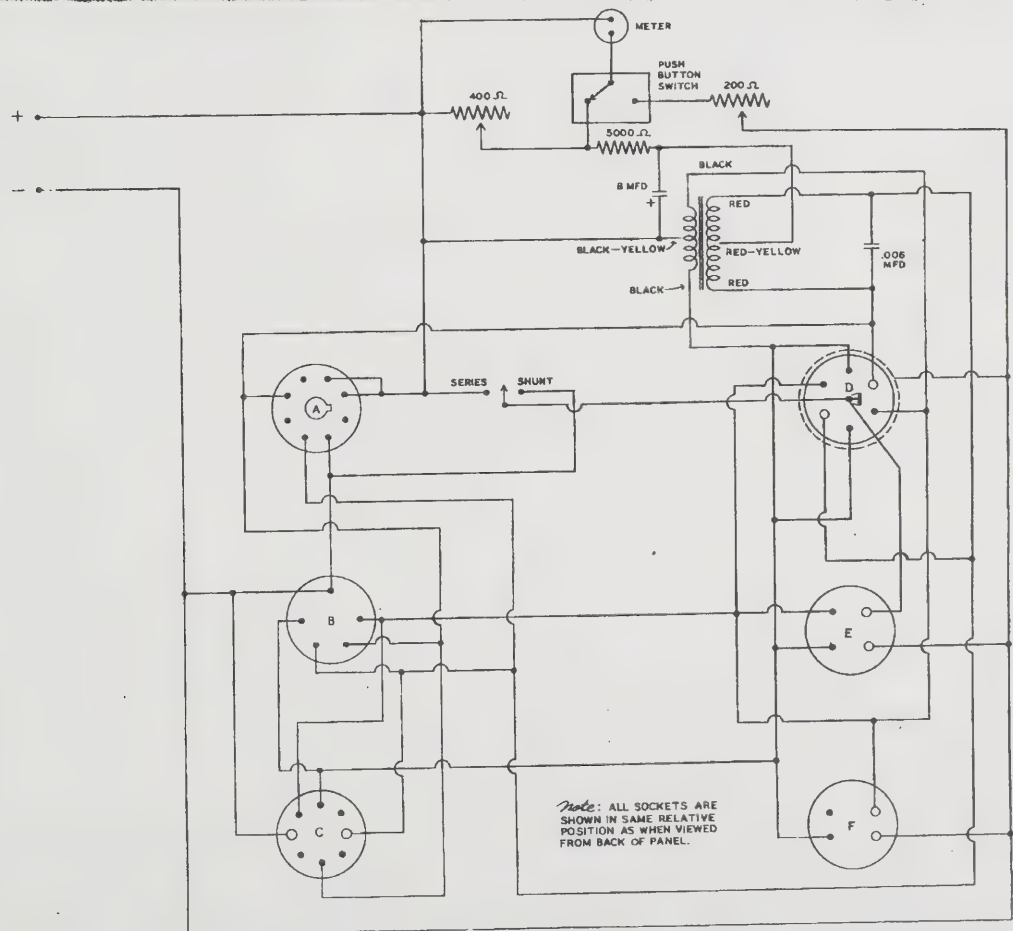
Heathkit
VOLTAGE CALIBRATOR
MODEL VC-2

HEATHKIT MODEL VT-1 VIBRATOR TESTER

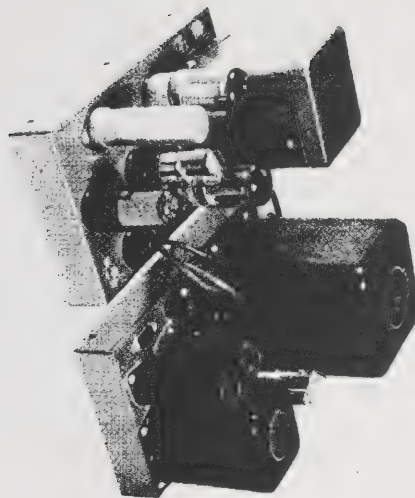


SPECIFICATIONS

- Power Requirements
4 to 6 Volts DC (Variable)
- Meter Indications
GOOD—BAD
- Size
Length 10", width 7 1/8",
Depth 3 1/2"
- Shipping Weight
7 Pounds



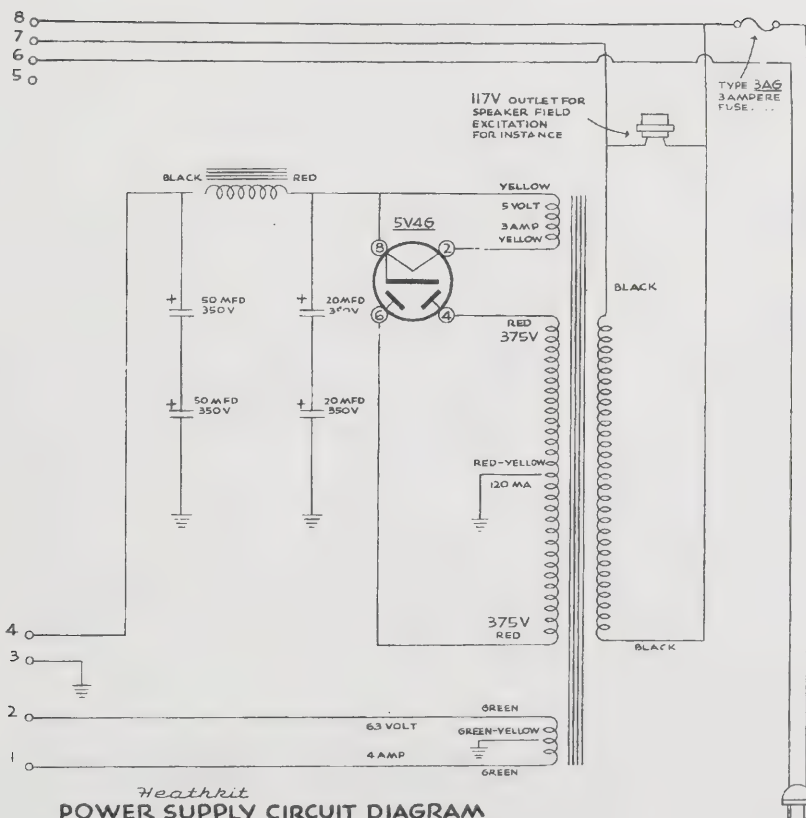
HEATHKIT "WILLIAMSON TYPE" AMPLIFIER MODEL W-2



TECHNICAL SPECIFICATIONS

Amplifier and Power Supply (W-2M)

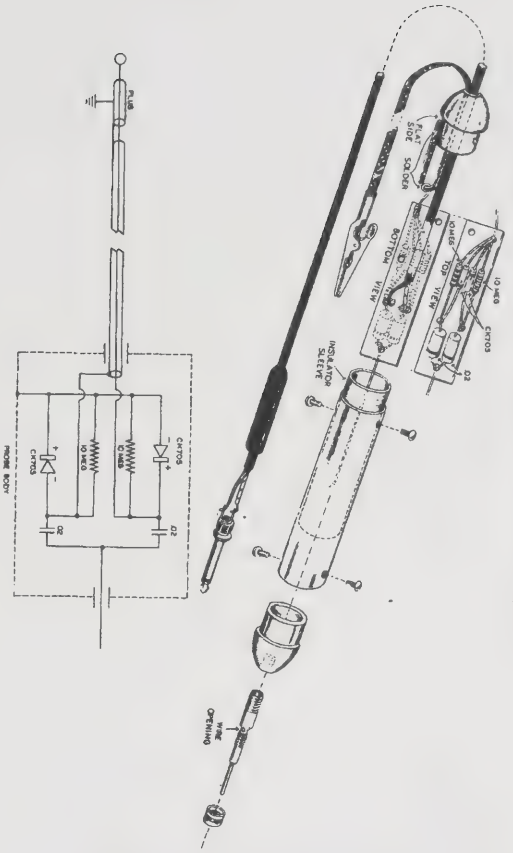
Tube Complement	2 - 6SN7GT; 2-5881; 1 - 5V4G
Frequency response	within 1 db from 10 cycles to 100 KC.
Harmonic distortion at 5 watt output	less than 0.5% between 20 cycles and 20 KC
1M distortion at 5 watt equivalent output	0.5% using 60 and 3000 cycles.
Output impedance	4, 8 or 16 ohms .
Input voltage for 5 watt output75 volts across 2.2 megohms
Power requirements	105-125 volts 50/60 cycles 120 watts.
Overall dimensions (each unit)	7" high x 5 1/2" wide x 11" long.



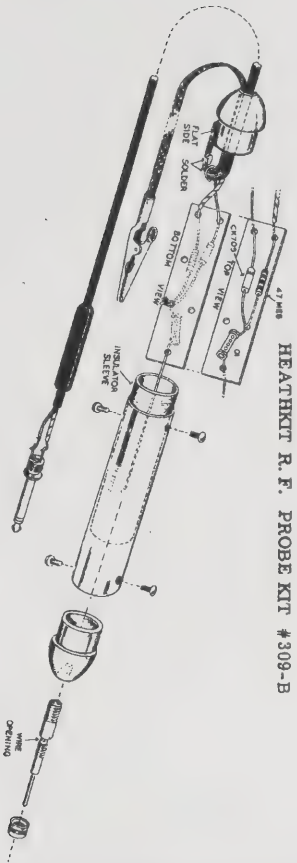
Tube Complement. 1-12AX7 (or 12AX7) and 1-12AV7.
Switch selected inputs. 2-low gain for crystal pickup and tuner.
Switch selected turn-over. 1-high gain for magnetic pickup.
Bass tone control at 20 cycles. for 78 RPM and LP on high gain channel.
Tunable tone control at 20KC. boosts 15 db max., cuts 15 db max.
Input voltage at 1KC for 1.2 volts output. boosts 15 db max., cuts 15 db max.
Power requirements. 0.2 volts across 1 megohm on low gain channels.
Dimensions less shafts and knobs. 0.004 volts across 22K on high gain channel
220V DC at 6 mA and 6.3V at 600 mA.
24" high $\times 10\frac{1}{2}$ " wide $\times 7\frac{1}{4}$ " deep.



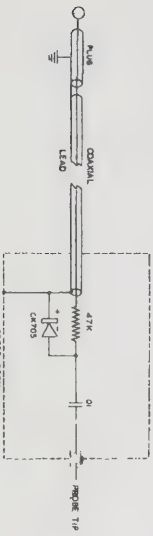
HEATHKIT PEAK-TO-PEAK VOLTAGE PROBE #338-B



PEAK TO PEAK PROBE 338-B

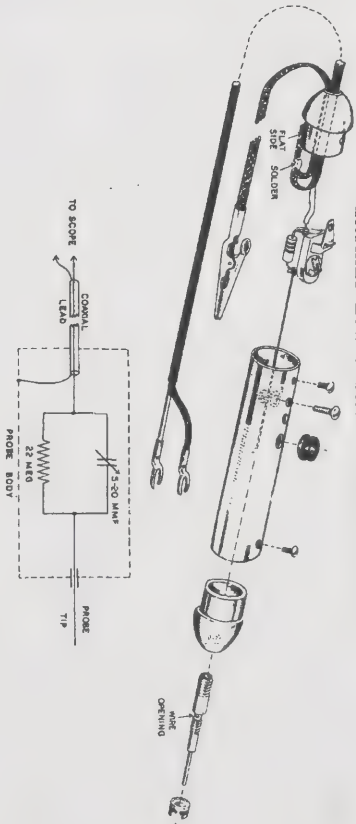


HEATHKIT R.F. PROBE KIT #309-B

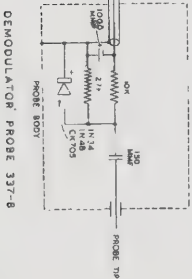
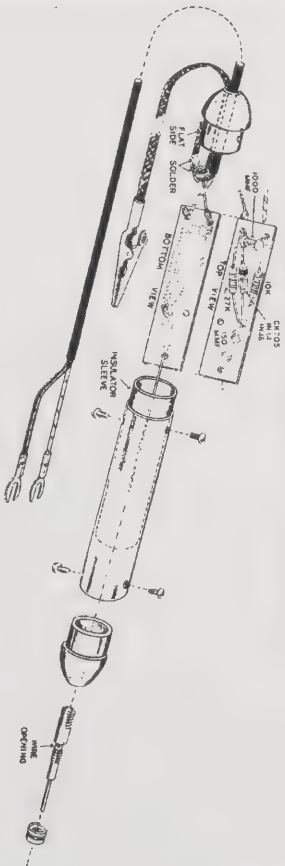


RF PROBE 309-B

HEATHKIT LOW CAPACITY PROBE KIT #342



HEATHKIT DEMODULATOR PROBE #337-B



DEMOMULATOR PROBE 337-B

This presentation of HEATHKIT SPECIFICATIONS AND SCHEMATICS represents the world's greatest selection of kit form electronic equipment offered by the world's largest kit manufacturing company.

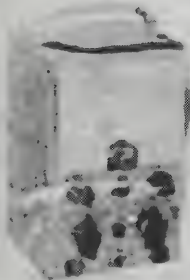
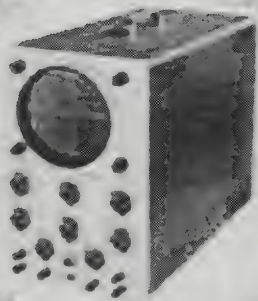
"Always the leader and pioneer in kit form electronics."

Heath Company Benton Harbor , Michigan

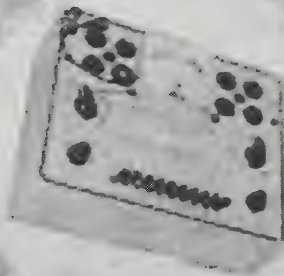


Quality

ELECTRONIC
EQUIPMENT
IN KIT FORM



Heathkit
**SPECIFICATIONS
and SCHEMATICS**



HEATH COMPANY . . . BENTON HARBOR, MICH.

HEATHKIT SPECIFICATIONS AND SCHEMATICS is intended to provide reference information and to answer your questions pertinent to Heathkit design.

The Heath Company has always freely offered schematics and technical information in the sincere belief that the material is interesting and will prove helpful to many.

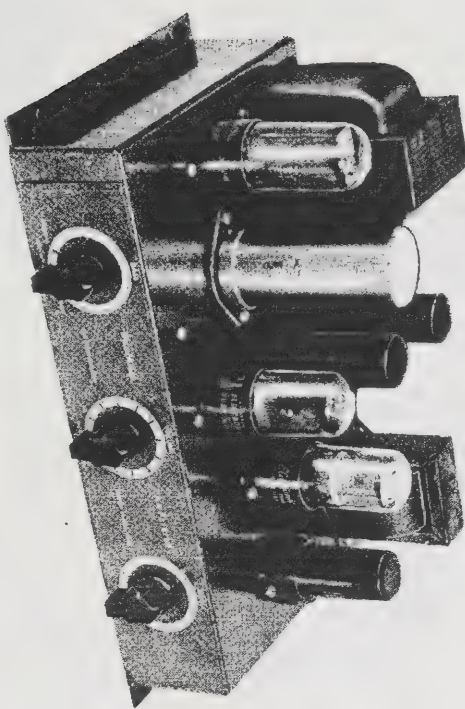
Heathkit pioneering in the electronic instrument kit field has resulted in the availability of a wide selection of useful well-designed, low cost electronic kit form equipment. Heathkits fulfill a major need in electronics and have been directly responsible for further stimulating interest particularly among electronics enthusiasts whose activity might be discouraged because of high equipment cost.

The combination of careful engineering, complete and detailed instruction manuals, use of highest quality components and exacting machine work in forming and punching of panels and chassis all combine to produce accurate, dependable test equipment which is a pleasure to construct and truly professional in appearance.

The advantages of constructing kit form test equipment are numerous. The builder saves the major portion of the cost of factory built equipment and becomes better acquainted with the circuitry and operation of the unit thereby gaining that important knowledge that will help him use the instrument far more intelligently over a wider range of applications. Should maintenance or repair ever be needed, the knowledge gained in construction will permit the kit builder to easily put the unit back into proper operating condition without delay.

It always has been and it always shall be our sincere desire to produce the best possible kit form test equipment at the lowest possible cost. Furthermore, we are anxious to help the Heathkit user in any way and at all times for we want every Heathkit owner to receive the many years of excellent operation for which his kit was engineered.

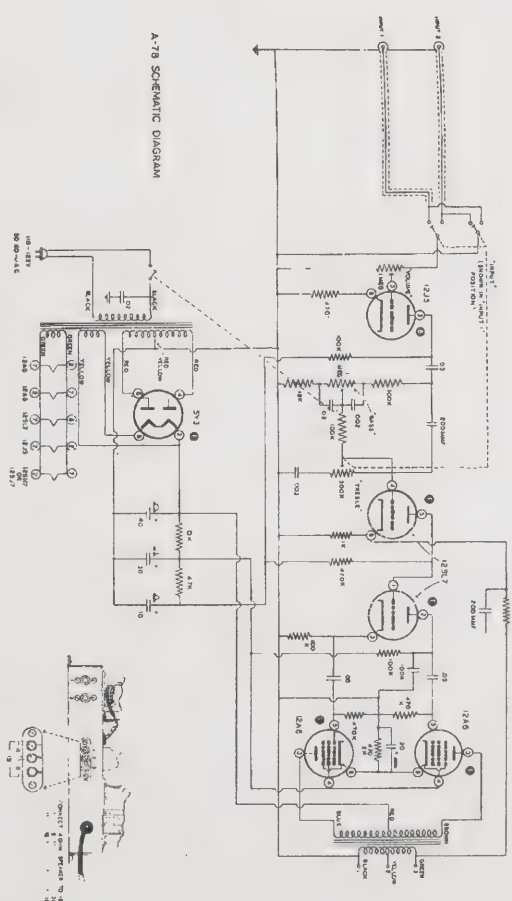
HEATHKIT MODEL A-7B and A-7C AUDIO AMPLIFIERS



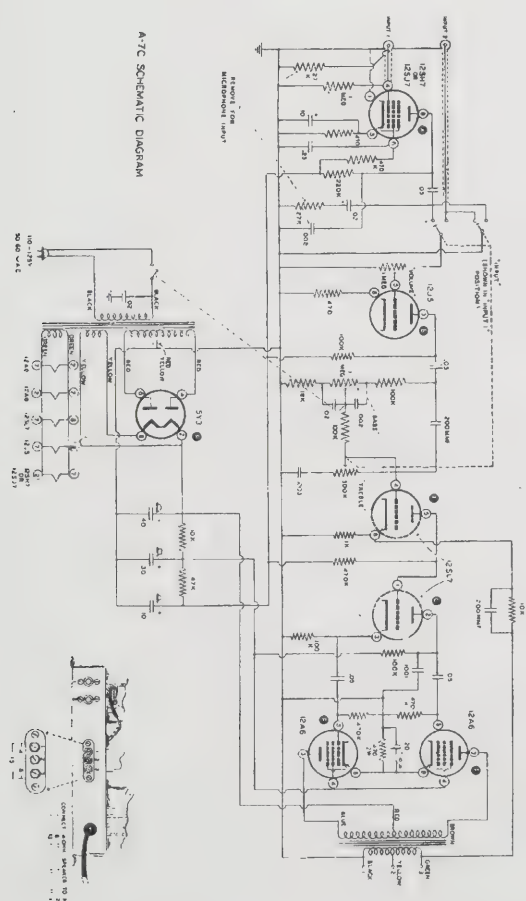
SPECIFICATIONS

Frequency Response.....	±1.5 db 20 to 20,000 cps
Power Output.....	6 watts
Tube Complement.....	1 - 12J5 First Amplifier 1 - 12SL7 Second Amplifier and Phase Splitter 2 - 12A6 Beam Power Output 1 - 5Y3 Rectifier 1 - 12SH7 or 12SJ7 Preamplifier (A-7C only)
Output Impedance.....	4, 8, or 15 ohms
Input Voltage.....	110-125 volts AC 50/60 cycles
Physical Specifications.....	11 1/2" wide, 5 1/4" high, 6 1/2" deep
Shipping Weight.....	10 lbs.

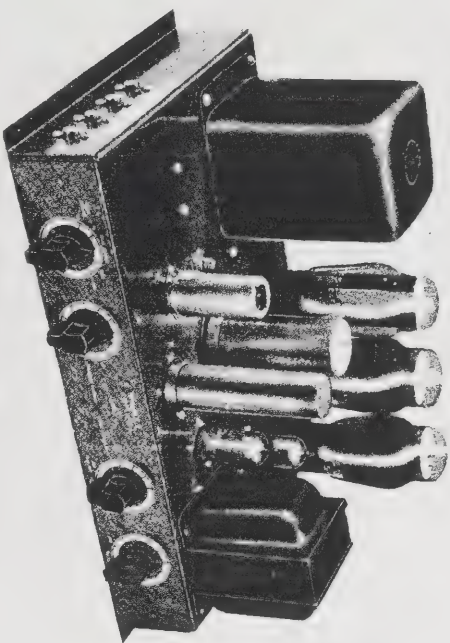
A-7B SCHEMATIC DIAGRAM



A-7C SCHEMATIC DIAGRAM

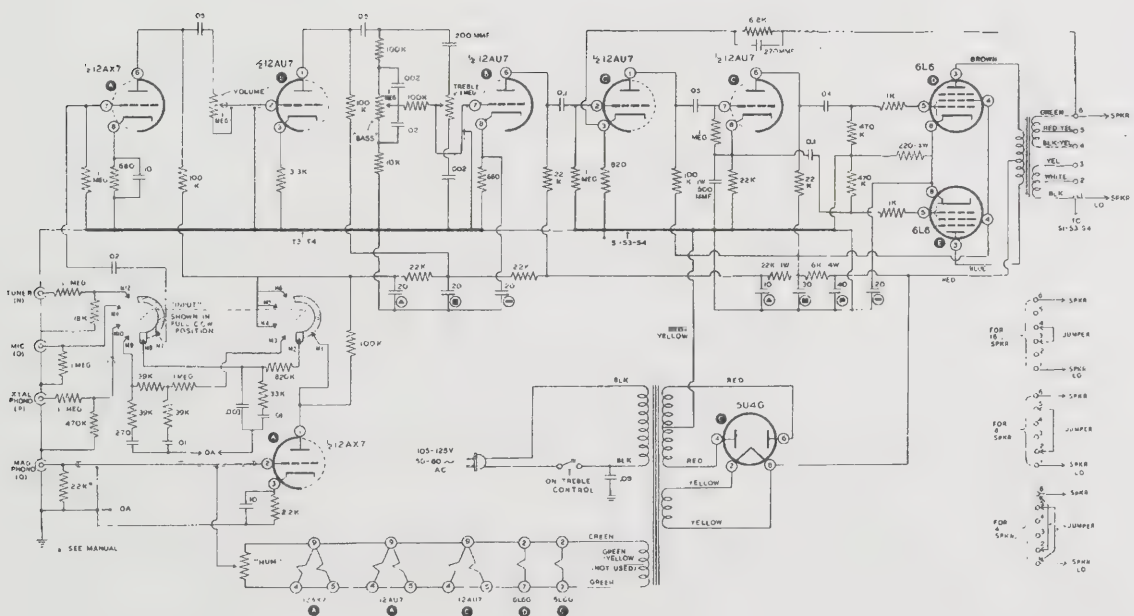


HEATHKIT AUDIO AMPLIFIER MODEL A-9A

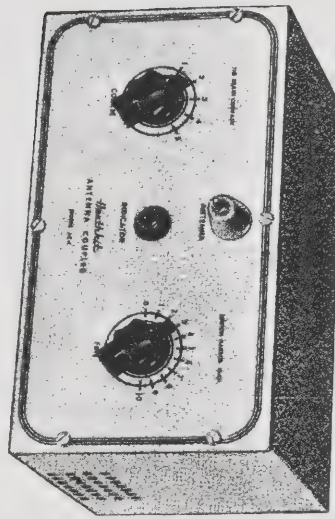


SPECIFICATIONS

Frequency Response.....	±1 db 20 to 20,000 cps
Power Output.....	20 watts
Total Harmonic Distortion.....	1% (at 3 db below rated output)
Input Requirements (for 15 watts output)	
Magnetic Phono Input.....	0.007 volts
Microphone Input.....	0.01 volts
Crystal Phono Input.....	0.08 volts
Tuner Input.....	0.6 volts
Tone Controls	
Bass (at 30 cps).....	15 db boost, 15 db cut
Treble (at 15 kc).....	15 db boost, 20 db cut
Power Requirements.....	100 watts, 105-125 volts 50/60 cycle AC
Tube Complement.....	12AX7 magnetic phono preamplifier and input amplifier 12AU7 voltage amplifier and tone control amplifier 12AU7 voltage amplifier and phase splitter Two 6L6G push-pull pentode power amplifiers 504G Rectifier 13 1/4" x 8 1/2" x 6 5/8" high 17 lbs.
Dimensions.....	
Shipping Weight.....	

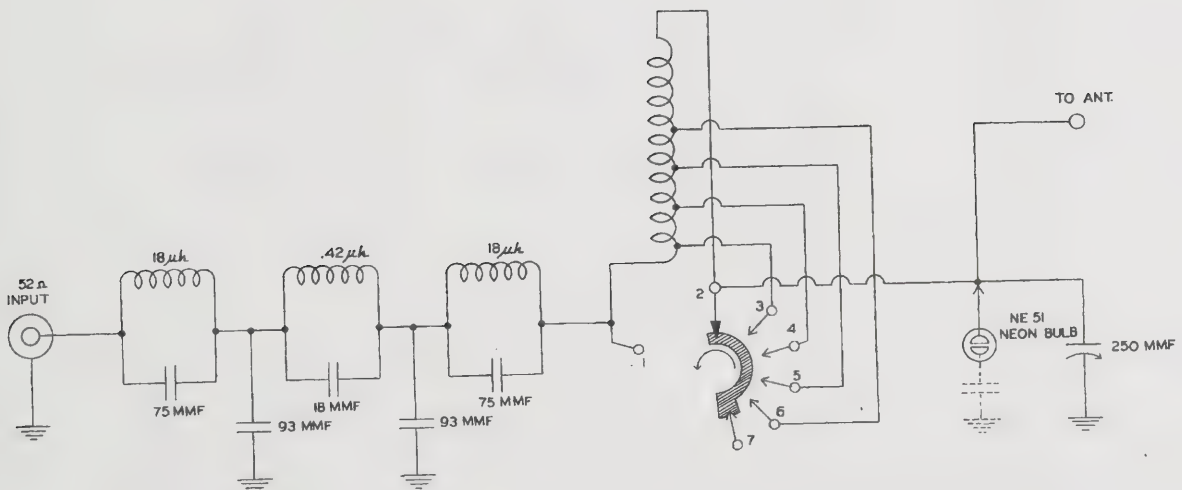


HEATHKIT ANTENNA COUPLER MODEL AC-1



SPECIFICATIONS

Maximum RF Power Input..... 75 watt
 Input Connection..... 52 ohm coaxial cable
 Output Connection..... Single-ended
 Low Pass Filter Cut-off Frequency..... 36 megacycles
 Dimensions..... 7 1/8" x 4 3/8" x 4 7/8"
 Net Weight..... 2 lbs.
 Shipping Weight..... 3 lbs.



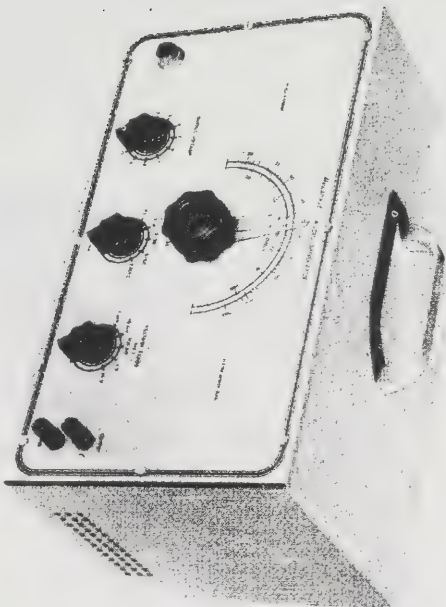
SCHEMATIC ANTENNA COUPLER

Physical Specifications:

12½" long x 7" high x 7½" deep, Shipping Wt. 12 lbs.

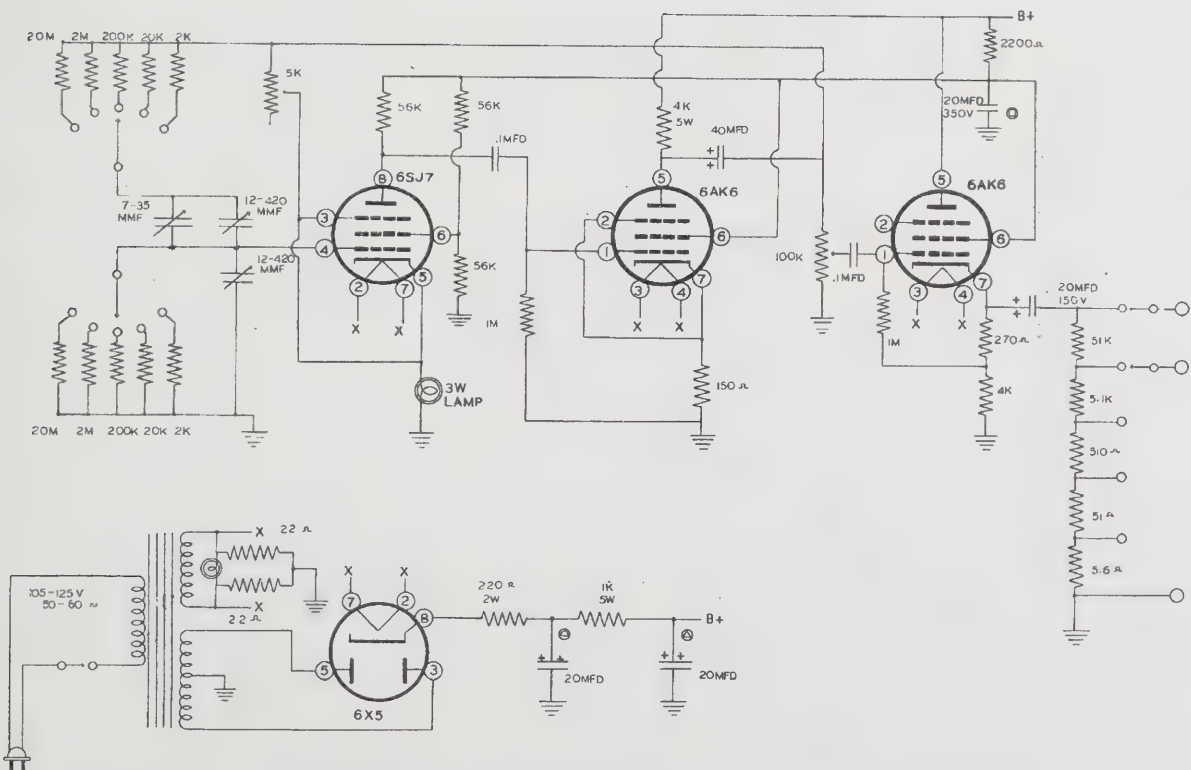


HEATHKIT AUDIO GENERATOR MODEL AG-8

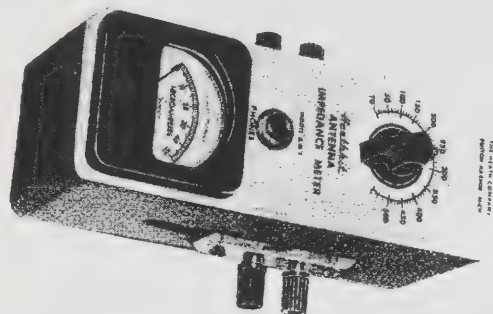


SPECIFICATIONS

Frequency range	20 cps to 1 mc in five ranges
Output voltage	10 volts (no load) plus or minus 1 db 20 cps to 400 kc; down 3 db at 600 kc; down 8 db at 1 mc.
Generator impedance	600 ohms
Distortion	less than 0.4%
Power requirements	30 watts, 105-125 volts 50-60 cycles AC
Dimensions	7 $\frac{1}{2}$ " high, 13 $\frac{1}{4}$ " wide, 7 $\frac{1}{2}$ " deep
Shipping weight	15 lbs.

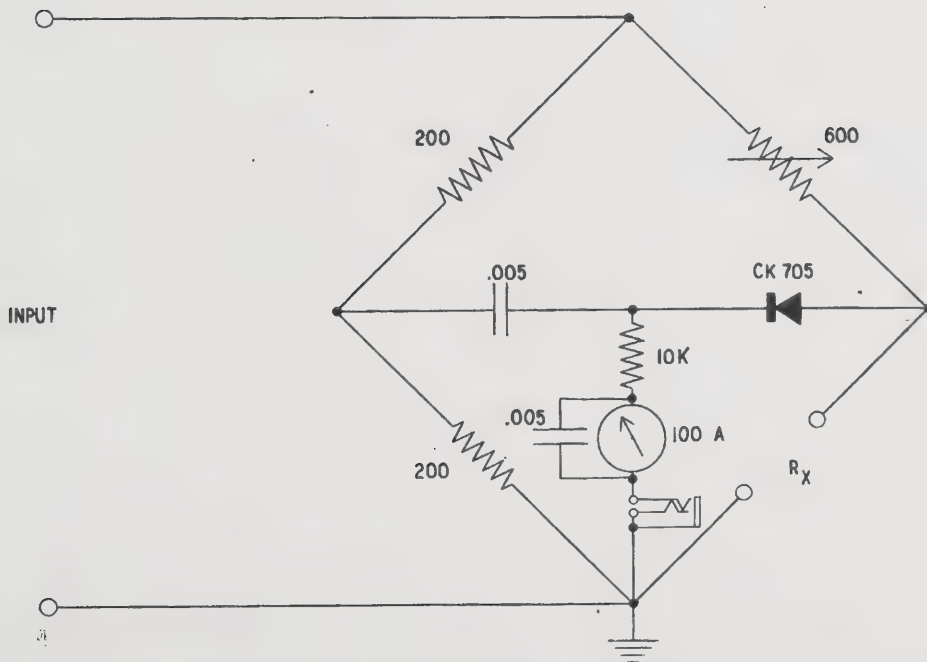


HEATHKIT ANTENNA IMPEDANCE METER MODEL AM-1



SPECIFICATIONS

Frequency Range..... 0-150 megacycles
 Impedance Range..... 0-800 ohms
 Null Indicator..... 100 μ ampere meter
 Dimensions..... 2 1/2" x 3" x 7"
 Net Weight..... 1 lb.
 Shipping Weight..... 3 lbs.

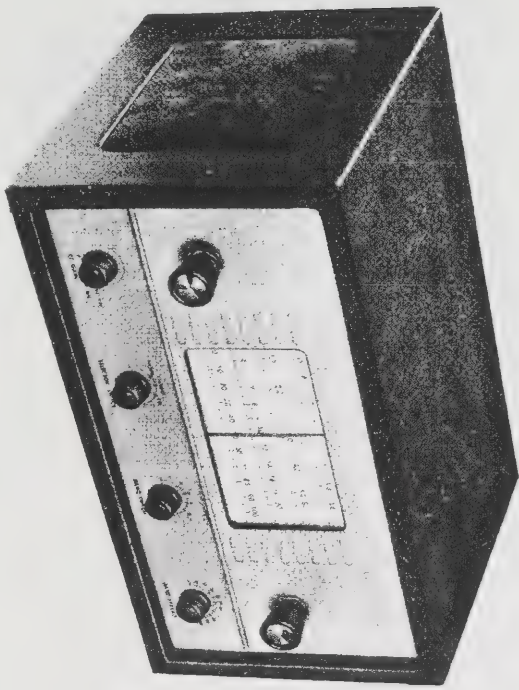


ANTENNA IMPEDANCE METER SCHEMATIC

A vintage Teko Model 1000 Oscillator, a portable electronic device in a metal case. The front panel features a large central dial with a needle, several smaller control knobs, and a frequency scale. The text "TEKO MODEL 1000 OSCILLATOR" is visible on the right side of the panel.

Frequency Range
Output Voltage (Sine Wave)
ⁿ
(Square Wave)
Generator Impedance
Distortion
Power Requirements
Dimensions
Shipping Weight

HEATHKIT MODEL AR-2 COMMUNICATIONS RECEIVER

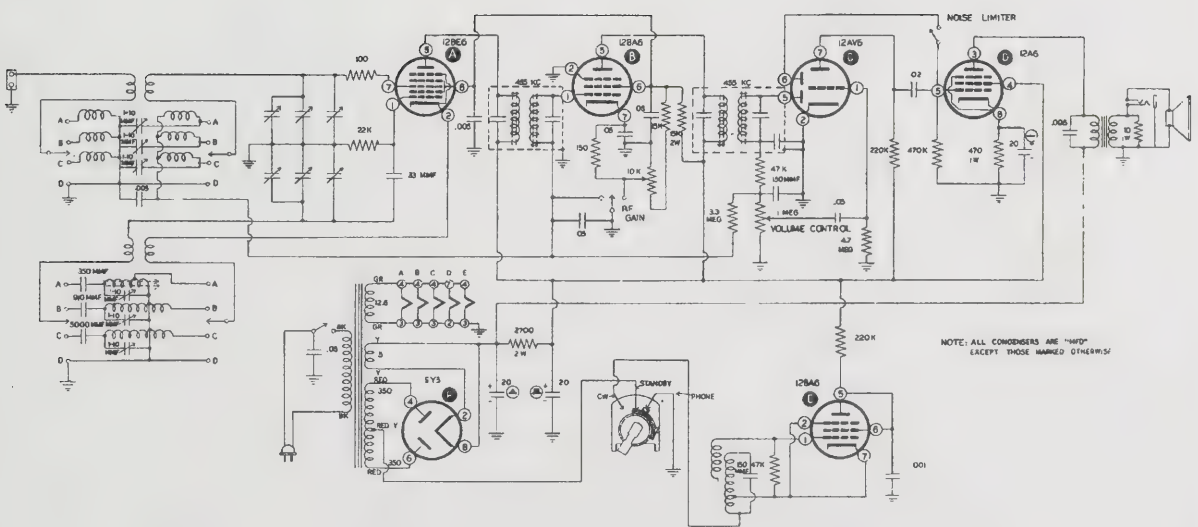


SPECIFICATIONS

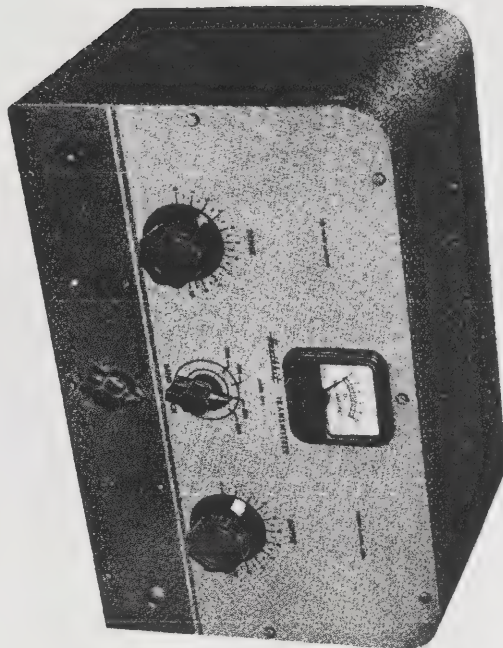
- Frequency Range..... 550 kc to 35 mc on four bands
 Tube Complement..... 1 - 12BE6 Oscillator and Mixer
 1 - 12BA6 IF Amplifier
 1 - 12AV6 Second Detector and First Audio
 Amplifier
 1 - 12A6 Beam Power Output
 1 - 12BA6 BFO Tube
 1 - 5Y3 Full Wave Rectifier
 Power Requirements..... 105-125 volts AC 50/60 cycles 4.5 watts
 Dimensions..... 11 1/2" wide x 5 3/4" high x 6 3/4" deep
 Shipping Weight..... 12 lbs.

FEATURES

- Band Spread Tuning
 Noise Limiter
 RF Gain Control
 Phone - Standby - CW
 Headphone Jack
 Ham Band Identifications

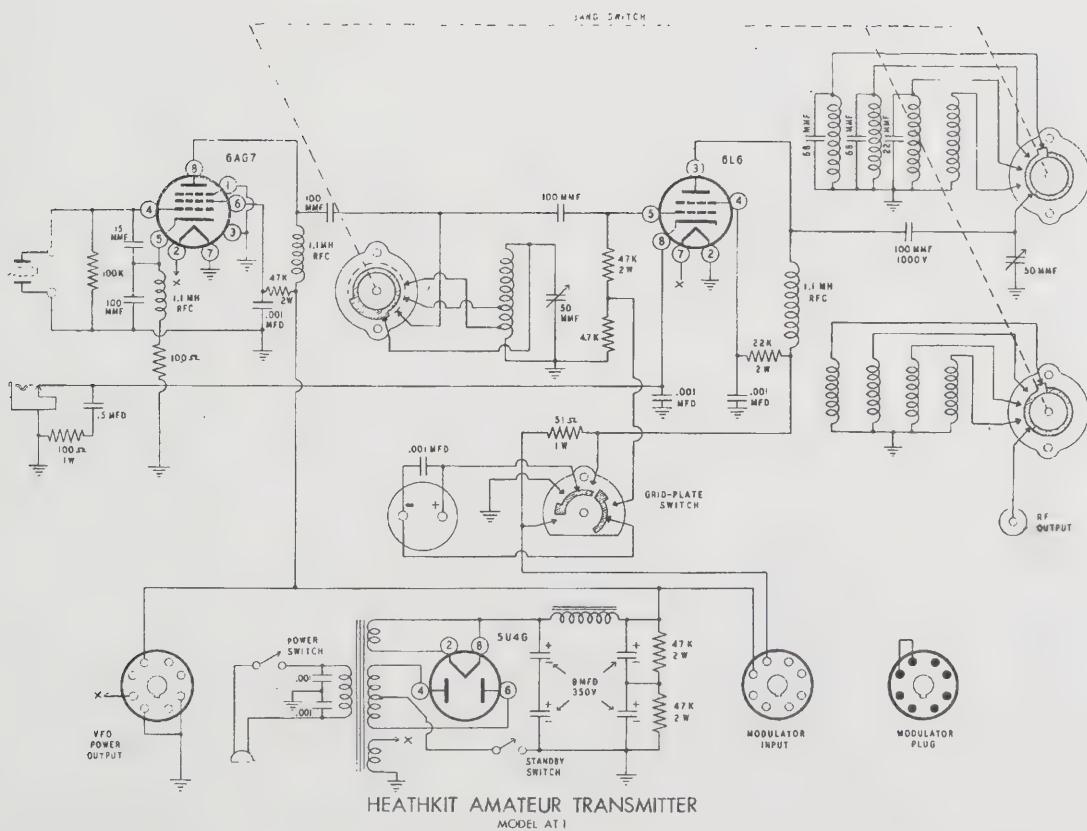


HEATHKIT AMATEUR TRANSMITTER MODEL AT-1

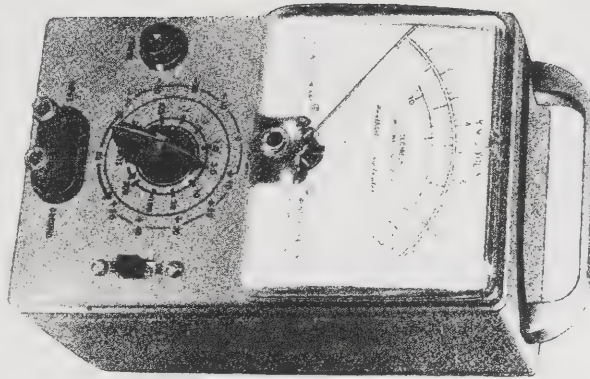


SPECIFICATIONS

RF Amplifier Power Input.....	25-30 Watts
Output Connection.....	52 Ohm Coaxial Cable
Oscillator Operation.....	Crystal, can be operated by a VFO
Amplifier Operation.....	CW, can be modulated for phone
Band Coverage.....	80, 40, 20, 15, 11, 10 Meters
Tube Complement	
5U4G.....	Rectifier
6AG7.....	Oscillator - Multiplier
6L6.....	Amplifier - Doubler
Power Requirements.....	105-125 50/60 Cycle, 100 Watts
Cabinet Size.....	8 1/8" high x 13 1/8" wide x 7" deep
Net Weight.....	13 lbs.

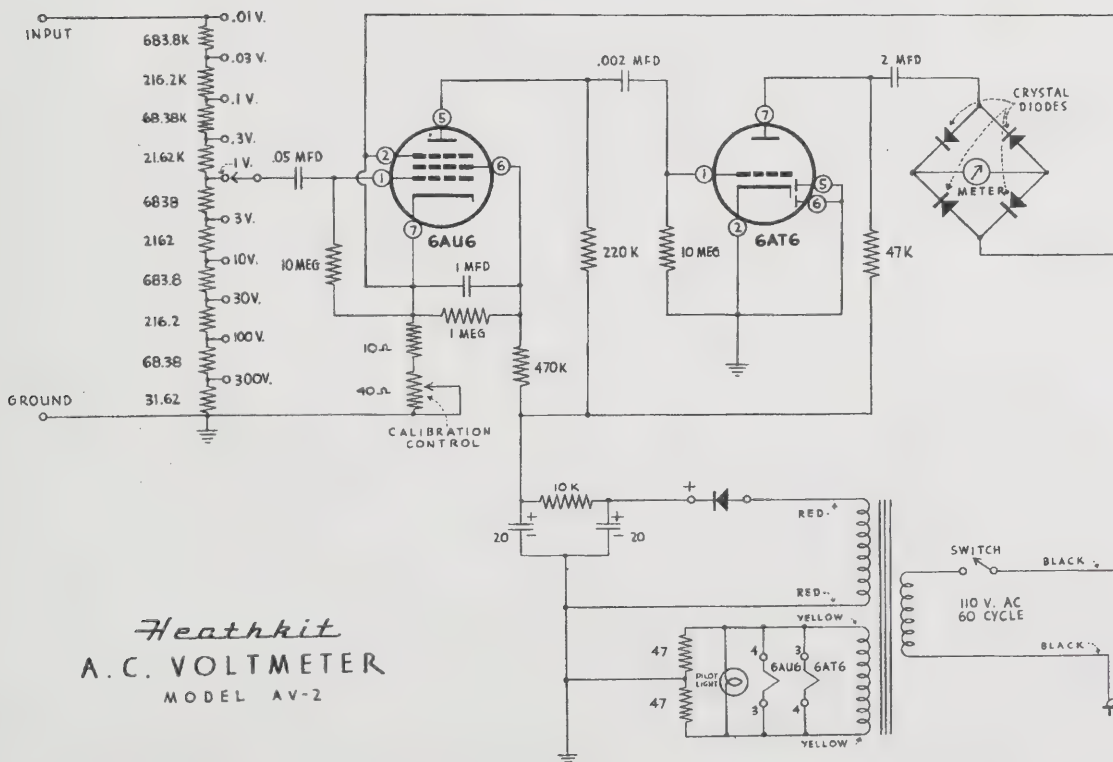


HEATHKIT MODEL AV-2 A. C. VOLTMETER

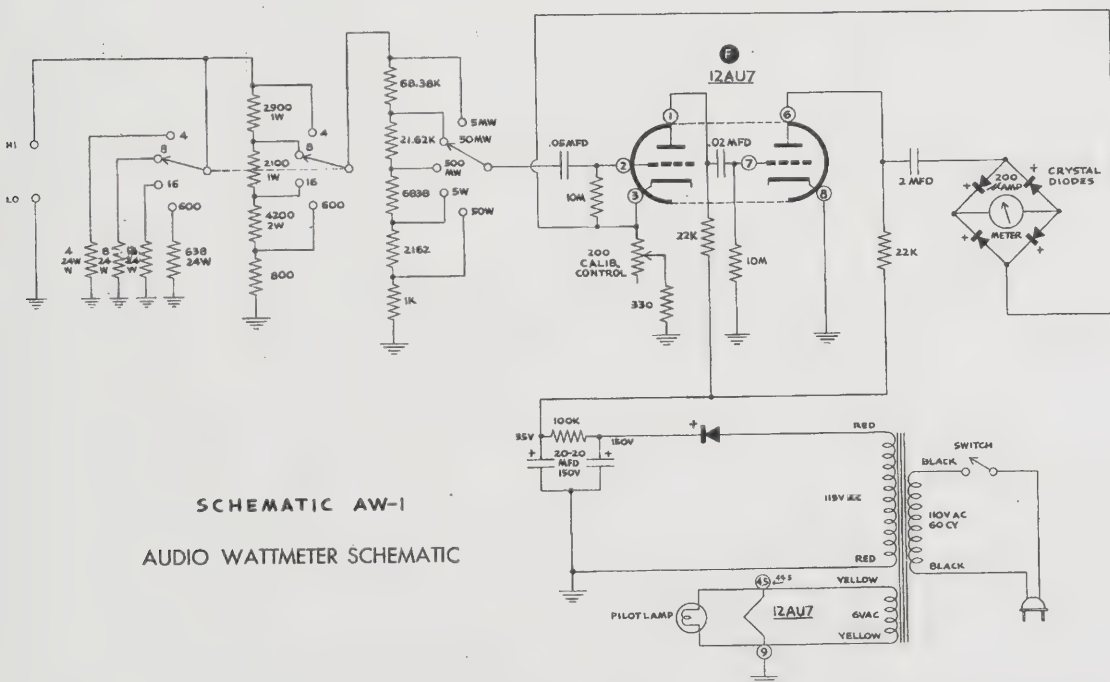


Technical Specifications

- Power Requirement:**
105-125V AC, 50-60 cycles, 10 Watts
- Tube Complement:**
1 - 6AU6 1 - 6AT6
- Input Impedance:**
1 Megohm at 1 KC
- Ranges:**
.01, .03, .1, .3, 1, 3, 10, 30, 100, 300 V RMS
- Decibels:**
Total range -52 to +52 db, scale -12 to +2 db.
1 MW - 600 ohm) ten switch selected ranges
from -40 to +50 db.
- Physical Specifications:**
7-3/8" high x 4-11/16" wide x 4-1/8" deep
- Net Weight** 3½ lbs.
- Shipping Weight** 5 lbs.



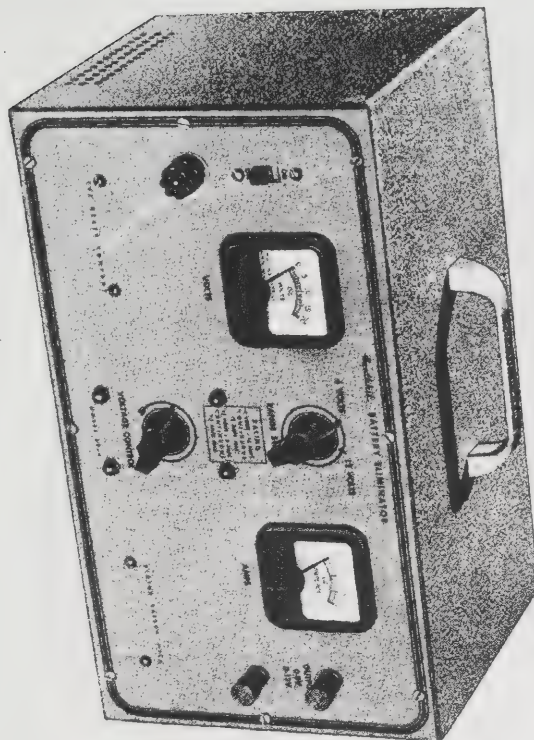
Frequency Range..... 1 db, 10 cycles to 250 kc
Wattage..... 0-5 milliwatts, 50 milliwatts, 500 milliwatts, 5 watts, 50 watts full scale.
DB Ranges..... Total range, -15 db to +48 db, scale -5 to -18 db (1 row - 600 Ω). Five switch selected ranges from 10 db to +30 db.
Load Resistors..... 4 Ω, 8Ω, 16 Ω and 600 Ω -non-inductive, switch selected.
Audio Input Power Ratings..... Up to 25 watts maximum continuous duty, 50 watts maximum intermittent. Duty cycle 50 watts is 3 minutes. Ventilated cabinet allows efficient cooling.
Multipliers.....
Meter..... Precision type
Meter..... 4 1/2" streamlined case with 200 microampere movement.
Meter Rectifier..... Crystal diode bridge for wide range frequency response.
Tune..... 12AU7 - voltage amplifier and current amplifier for meter.
Power Supply..... Power transformer and selenium rectifier
Power Requirements..... 105-125 volt AC, 50/60 cycles, 6 watts
Dimensions..... 7 3/8" high x 4 11/16" wide x 4 1/8" deep
Net Weight..... 3 lbs.
Shipping Weight..... 6 lbs.



SCHEMATIC AW-1

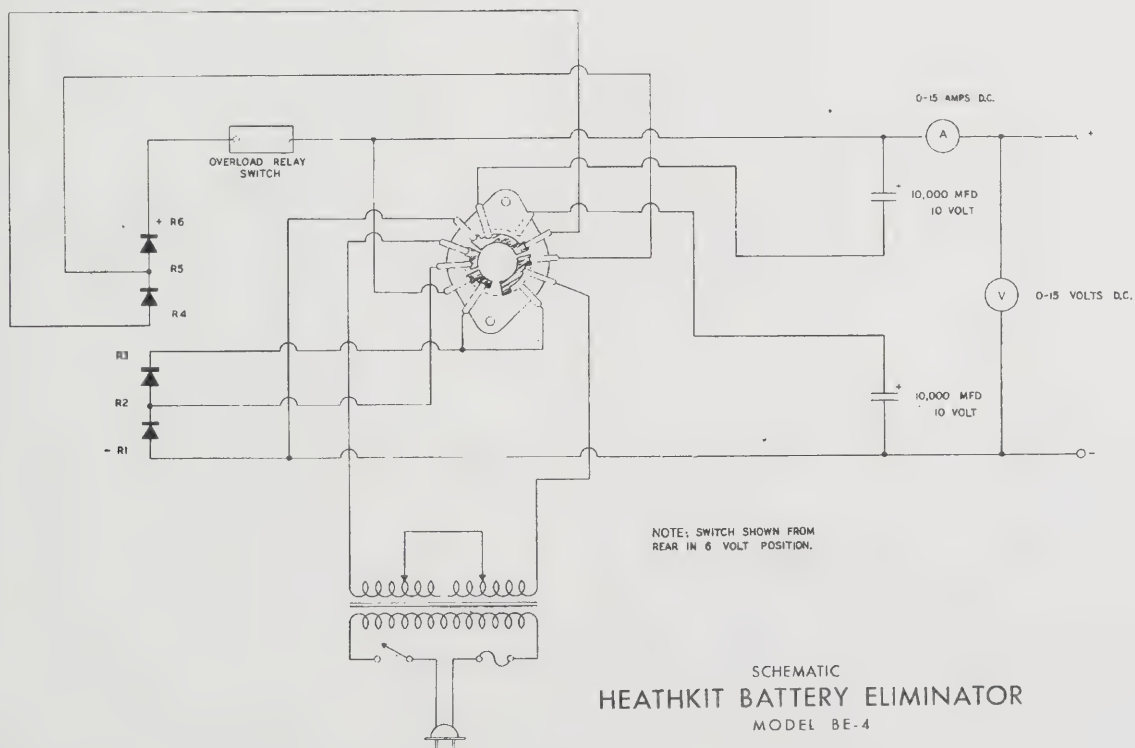
AUDIO WATTMETER SCHEMATIC

HEATHKIT BATTERY ELIMINATOR MODEL BE-4



SPECIFICATIONS

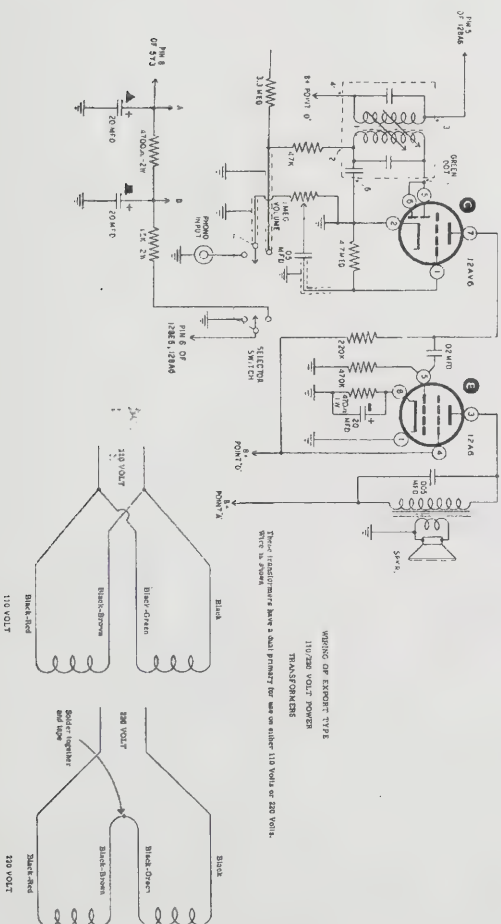
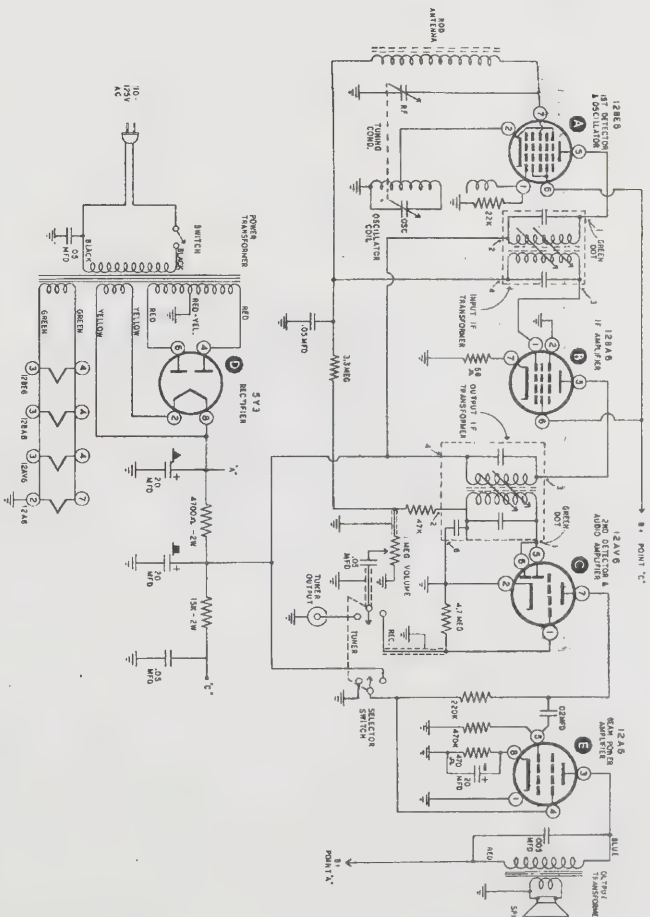
Continuously variable voltage output	
0-8 volts DC.....	10 amperes continuously
0-16 volts DC.....	15 amperes maximum intermittent
	7.5 amperes continuously
Power Requirements.....	105-125 V., 50-60 cycles AC at 175 watts
Dimensions.....	13 1/4" wide x 7 1/2" deep x 7 1/4" high
Approximate shipping weight.....	22 lbs.



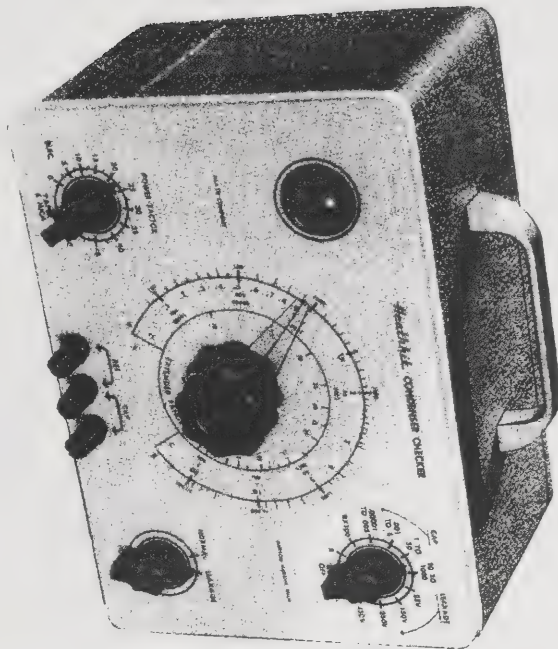
Carrier Frequency.....	.60 to 80 megacycles
Modulating Frequencies	113 to 172 KC
Radio Frequency (Horizontal Linearity).....	460 cps. (Approx.)
Low Frequency (Vertical Linearity).....	100,000 microvolts
Output Voltage.....	12AT7
Tube.....	Transformer operated half-wave selenium rectifier
Power Supply.....	105-125 volts, 50-60 cycles AC
Power Requirements.....	8 1/8" wide, 4 3/8" high, 4 1/8" deep
Dimensions.....	6 lbs.
Shipping Weight.....	



Radio	
Tuning Range	560 kc to 1620 kc
I. F. Frequency	465 kc
Antenna	Built-in High Sensitivity Rod Type
Speaker (included)	5 1/2" PM 4 ohm Voice Coil
Tuner Operation	High impedance to any amplifier input with resistance of 100,000 ohms or more. 110 V outlet provided for amplifier, phono player, etc.
Phonograph Input	1 megohm high impedance for optimum performance with any good quality crystal or ceramic phono pickup.
Tube Complement	1 - 5Y3 Rectifier 1 - 12A6 Beam Power Amplifier 1 - 12AV6 Detector, A.V.C. and Audio Amplifier 1 - 12BA6 I. F. Amplifier 1 - 12BE6 Pentagrid Converter 105-125 V 50-60 cycles AC 40 watts 11 1/2" wide, 5 3/4" high, 6 3/4" deep
Power Requirements	
Dimensions	

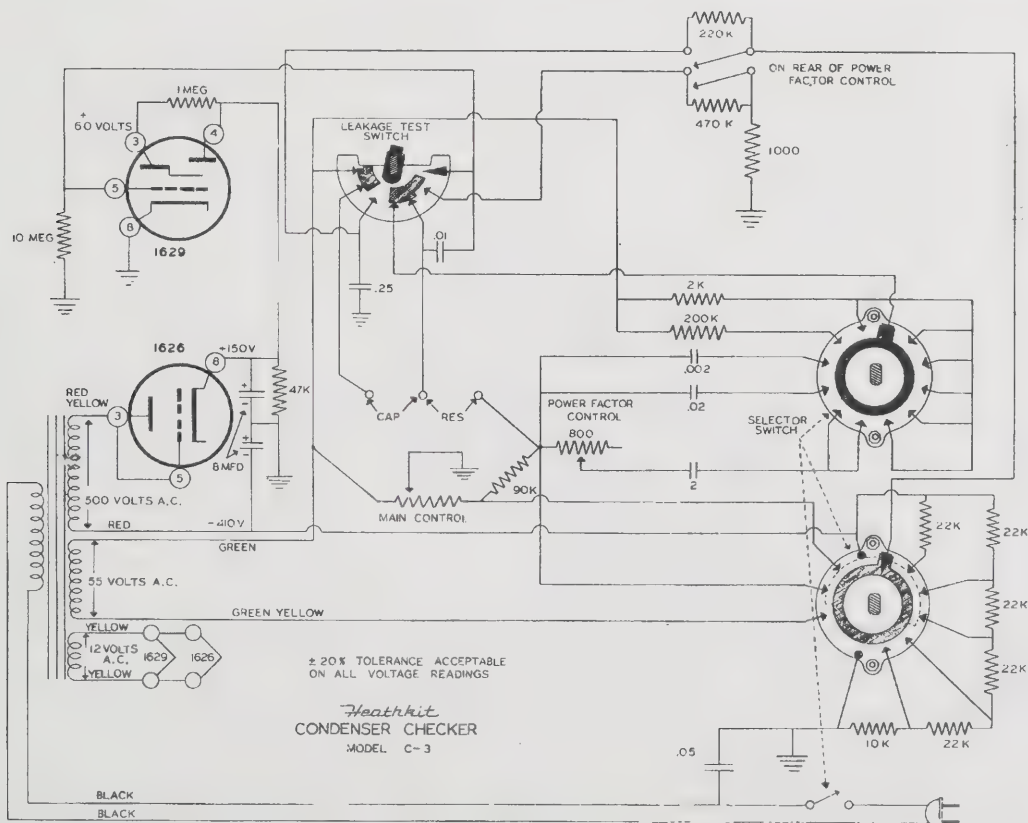


HEATHKIT CONDENSER CHECKER MODEL C-3



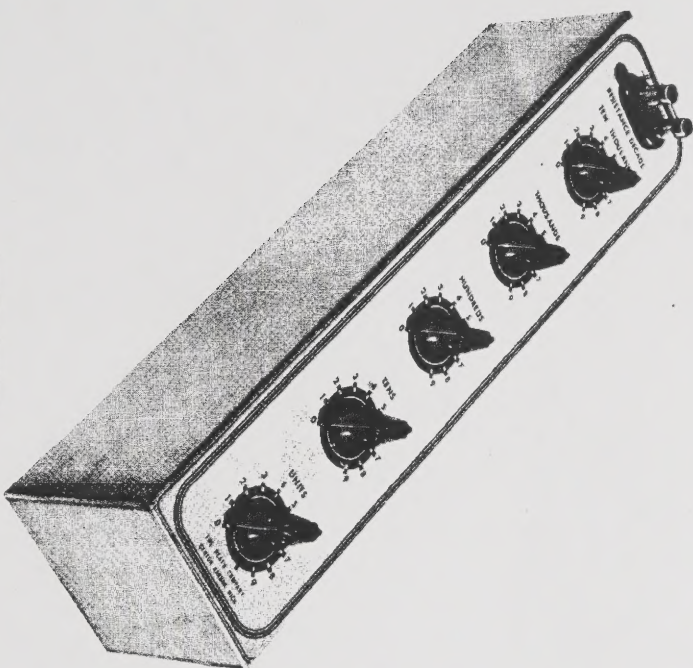
SPECIFICATIONS

Power Requirements:	110-125 volts, 50-60 cycles a-c
Cabinet Size:	9 1/4" wide x 6 1/2" high x 5" deep
Kit Shipping Weight:	7 pounds
Power Supply:	Power transformer—half wave rectifier
Capacity: 4 Ranges:	.00001 mfd - .005 mfd .001 mfd - .5 mfd .1 mfd - 50 mfd 20 mfd - 1000 mfd
D-C Leakage Test	
Polarizing Voltages: 5 Ranges:	25 volts d-c 150 volts d-c 250 volts d-c 350 volts d-c 450 volts d-c
Resistance Ranges: 2 Ranges:	100 ohms to 50,000 ohms 10,000 ohms to 5 megohms
Circuit:	A-c-powered bridge for both capacitive and resistive measurements. Maximum opening of electron beam indicator denotes bridge balance.



HEATHKIT MODEL DR-1

DECADE RESISTANCE KIT



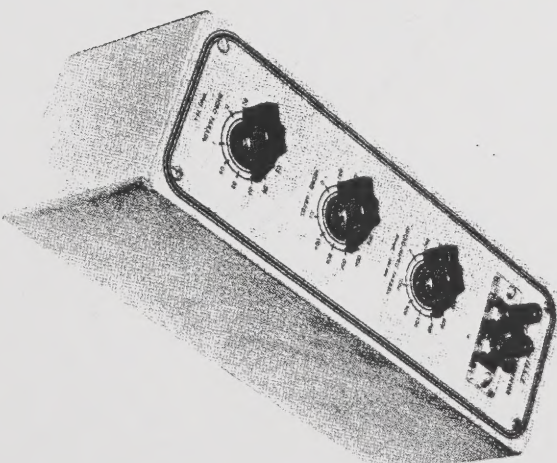
SPECIFICATIONS

Range.....	1 Ω to 99,999 Ω in one ohm steps
Components.....	Resistors: Precision - 1/2% accuracy Switches: Ceramic
Maximum Current.....	Units-----500 MA Tens-----150 MA Hundreds-----50 MA Thousands-----15 MA Ten Thousands-----5 MA
Dimensions.....	14 1/2" x 3 3/8" x 3 3/8" Birch Cabinet

HEATHKIT

MODEL DR-1

HEATHKIT DECADE CONDENSER MODEL DC-1



SPECIFICATIONS

Range.....	100 mmf. to 0.111 mfd. in increments of 100 mmf.
Voltage Rating.....	350 volts DC, continuous; 500 volts DC, intermittent; 1000 volts DC test.
Dielectric.....	Silver mica
Accuracy of Incremental Capacity.....	Plus or minus 1%
Zero capacitance.....	15 to 20 mmf. with all switches set at zero
Dimensions.....	3 3/4" wide, 4 3/4" high, 10 5/8" deep
Shipping Weight.....	4 lbs.

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